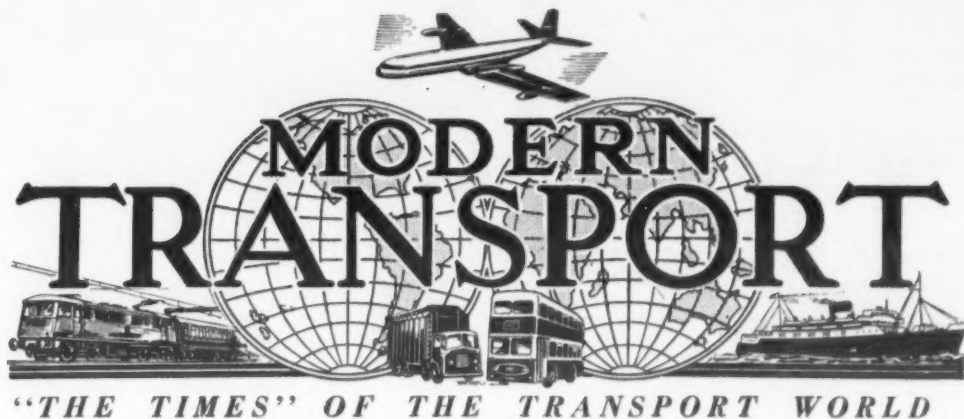


ACCS

See Page 15

NEW
SIGNALLING
AT
AMERSHAM

See Page 2

VOL. LXXXIII No. 2146

[Registered at the G.P.O.
as a newspaper]

LONDON, JULY 2, 1960

PRICE ONE SHILLING

Diesel-Electric Pullmans

AT the end of last week there were public demonstrations of the magnificent diesel-electric Pullman trains designed and built by Metropolitan-Cammell Carriage and Wagon Co., Limited, for service on British Railways. They set a new standard of travel comfort and expediency, providing simultaneously good riding, rapid acceleration, silence, air conditioning and luxurious but practical equipment. On a humid and thundery day the air in the coach remained pleasantly fresh and cool. The double windows, with sunblinds working between them (for each individual seat in the first class and for pairs of seats in the second); the comfortable seats adjustable for reclining and for travel to and from the table in the first-class parlours; the call system for the attendants; the shadowless lighting; the scheme of decor—all are excellent. The trains will be a model and we have no doubt that railway officers from all over the world will come to Britain to study them. In this issue we detail some of the technical equipment which has gone into the design after three years of study of an exacting requirement from the Pullman Car Company and the British Transport Commission. There is a two-stage Westinghouse electro-pneumatic brake which automatically adjusts itself from applications at high running speeds as momentum is absorbed, giving exceptionally smooth stops from 90 m.p.h. over short braking distances; the G.E.C. traction equipment, powered by N.B.L.-M.A.N. engines; the Stone air conditioning, heating and lighting equipment, employing Rolls-Royce diesel engines; and above all, the know-how of a firm of carriage-builders of worldwide fame.

The First Fruits

THE Midland Pullman, as already announced, begins service for the London Midland Region between Manchester and St. Pancras and St. Pancras and Leicester on July 4. At a date yet to be decided the Western Region will introduce its eight-car trains with first and second class accommodation from Bristol to Paddington and from Wolverhampton and Birmingham to Paddington. Running Mondays to Fridays, these trains also in Nanking blue and bearing the simple legend *Pullman*, will provide some fast services, such as Bristol—Paddington nonstop via Badminton in 110 minutes and Paddington to Bristol with a stop at Bath in 115 minutes. Wolverhampton to London will occupy 155 minutes with stops at Birmingham Snow Hill, Solihull and Leamington Spa General; from Birmingham, even with two stops, only 125 minutes is allowed. London to Snow Hill with a Leamington stop is booked in 115 minutes. Meanwhile, next week sees the coming to fruition of a notable idea which emanated from the chairman of the B.T.C., Sir Brian Robertson, and which has been pursued untiringly on the operator's side by Messrs. D. Blec, A. R. Dunbar, F. D. M. Harding, F. G. Hole, and E. J. Morris.

Progress in Technical Education

ONE of the signs of a rapid expansion in technical education is the growth of the full-time teaching force in technical colleges, some figures of which were given last Friday by Sir David Eccles, Minister of Education, when he addressed the Conference of the Association of Education Committees at Eastbourne. It took seven years from 1949 to 1956 to increase the number of technical teachers in service from 5,000 to 10,000, but only four years to raise the number to the current total of about 17,000, a figure that was now rising by nearly 2,000 a year. This represented a great effort on the part of the colleges and was a remarkable achievement of local education authorities and governing bodies to have thus beaten the target of 1,400 additional teachers a year set by the Willis Jackson Committee. Sir David Eccles said that the load on present teaching staffs was still too heavy, making it difficult to release teachers for training courses and other forms of study, and that colleges were not getting enough well-qualified technologists to fill key posts such as principal lecturers and heads of

departments. The latest figures seemed to show that the annual increase in technology graduates had risen from about 50 in 1956 to about 200 in 1959, which was still short of the Willis Jackson figure of 256. This meant that colleges must be able to offer conditions of service attractive to highly qualified men and women. The Ministry of Education was at present collecting from colleges their forecasts of staff needs covering the next few years and the National Advisory Council on the Training and Supply of

CURRENT TOPICS

Competition in Caution

ANYTHING constructive aimed at the avoidance or reduction of road accidents deserves earnest consideration and there is no doubt that the effects of a competition organised by the National Safety League, which is sponsored by the Firestone Safety Foundation and administered by the British Safety Council, will be watched with interest. The competition, called a competition in caution, in opposition to that less congenial competitive spirit evident all too

LEADING FEATURES IN THIS ISSUE

Portrait	PAGE		PAGE
Sir George Dowty, F.R.Ae.S.	9	£11m. Locomotive Equipment Orders: 170 Sets of Engines and Transmissions	11
Special Articles		Heavy-duty Side Fork Carrier: Will Transfer 10-ton Containers	12
Wages, Modernisation and Inquisition	2	Cash-and-Carry: Wholesaler Sheds Transport Burden	12
Crewe Bus Station Opened: Contribution to Town Development Scheme	3	B.T.C. Report for 1959: Railways Recover Ground	13
The New Diesel Pullmans: Details of Power Equipments, Brakes and Air Conditioning	5	Regular Features	
Rail Wage Agreement: Based on Guillebaud Report	9	Commercial Aviation	9
New Air-Riding Vehicle: Britten-Norman Cushioncraft Demonstrated	10	Financial Results	14
U.K.R.A.S. to Advise Pakistan on Electrification	10	Forthcoming Events	12
Aluminium in Railway Rolling Stock: Exhibition at Strasbourg	11	Important Contracts	14
		Lorry, Bus and Coach News	4
		News from All Quarters	8
		News Summary	2
		Publications Received	10
		Shipping and Shipbuilding	14
		Social and Personal	15

Teachers would shortly be framing new estimated requirements to replace those of the Willis Jackson Committee.

Supersonic Timetable

HAVING recently made a world tour to study the development of commercial supersonic aircraft, Mr. C. O. Turner, chief executive of Qantas Empire Airways, recently predicted that in the early 1970s Australians will be able to have breakfast in Sydney and luncheon in London on the same day. Prototypes, for troop carrying and other military activities, were already being designed in America, Britain, France and Russia, and could be operational within five years. These supersonic air liners would fly at 70,000 ft. and better than 2,000 m.p.h. They would cut the flying time from London to Sydney to less than 10 hr. Allowing for time differences, and about four hours for ground stops en route, this would mean a passenger who left Sydney at 8 a.m. would reach London at 11.30 the same morning. Qantas had prepared a timetable for such a supersonic Sydney—London flight, and under this, flying from Darwin to Singapore, the latter would be reached 20 minutes before leaving Darwin. The supersonic air liners envisaged would be torpedo-like, stainless steel tubes with delta-shaped wings at the rear. They would be about 150 ft. long and accommodate 80 or 90 passengers in a long, corridor cabin with a diameter of about 12 ft.—much the same width as today's jets. The engines, which had already been developed, would be at the rear. It was unlikely the supersonic aircraft would have many windows, as these would be subjected to tremendous pressure and heat friction at speeds of 2,000 m.p.h. There would be television, possibly an individual screen to every passenger, which could be used to watch programmes or to study the land over which the aircraft was flying. Supersonic aircraft could use any airfields which conformed to major international standards. There would, of course, be problems in fitting them into the traffic patterns, but here again research was well forward and it would probably be easier than people imagined.

often between road users these days, which was announced at a House of Commons reception last week, involves 79 towns and cities throughout Britain. Competing areas are placed in one of four divisions of the league according to population. Each month, for a year, plus or minus ratings are awarded to each town according to the accident figures compared with the monthly average during the past five years. Cumulative plus or minus rating determine position in each division at the end of each year. At the end of the first year, March 1961, the top four competing towns will receive awards and the one with the highest percentage improvement will merit the title Safety Town of Great Britain and win a trophy to be held for a year. Presentations will also be made to the winning town's road safety officer and its police authority. Results already computed for the 79 competing towns and cities for last April show wide divergencies ranging from a highest improvement of nearly 38 per cent at Yarmouth to a worsening by over 81 per cent at South Shields. London is not at present included in the league because of boundary difficulties, but next year there might be a separate division for London boroughs.

Useful Main-line Widening

THE widening of the East Coast main line north of York by the construction of an additional line between Pilmoor and Alne stations—one of the most important track improvement schemes so far undertaken by the North Eastern Region—was completed on June 19. Provision of this additional track means that throughout the 30 miles between Northallerton and York (Skelton) there are two lines in each direction, thereby eliminating the former bottleneck between Pilmoor and Alne where one southbound track was required to carry an average of 130 trains a day ranging from high speed East Coast expresses to heavy freight and mineral trains. The new five-mile section of line joins the relief southbound line which previously terminated at Pilmoor and commenced at Alne. In addition to easing the problem of traffic working, it has

become possible to schedule more advantageous freight train timings. In this connection the majority of the trains from Tees-side and the North which has hitherto had to be routed via the Leeds Northern line (Ripon, Harrogate and Wetherby), is being diverted to travel over the main line via York. This avoids the necessity to provide assisting engines on the Leeds Northern route and will result in faster transit times and the more efficient and economical use of engines and train crews. To accommodate the new line it has been necessary to carry out considerable widening of track formation and bridges. In all, five road bridges and three rail bridges have been reconstructed, major work being done during weekends to keep interference with main-line trains to a minimum.

World Tourist Traffic

MOST countries of the world enjoyed a higher volume of tourist traffic from abroad in 1958 than in 1957 according to the twelfth annual report of the Study Commission of the International Union of Official Travel Organisations on International Travel Statistics. The report, *International Travel Statistics 1958*, has just been published and may be obtained from the British Travel and Holidays Association, 64 St. James's Street, S.W.1 (price 16s. 6d.). It contains statistics covering 55 countries, from Algeria to Vietnam, including a number of Iron Curtain countries, and provides a useful indication of the main trends in world travel. Decreases in tourist traffic were recorded by a few countries, the most notable being Barbados and Egypt, whose traffic decreased by 25 per cent and 14 per cent respectively. It is evident that international tourist traffic in Europe as a whole increased substantially. In view of the Brussels exhibition the rise of 60 per cent in the number of visitors to Belgium is not surprising and no doubt Bulgaria merited its 52 per cent increase to 27,743. It is not, however, indicated why the East Germans should have accounted for 3,600 of that 9,000-odd rise. Turning to more normal expansion, Turkey had 14 per cent more visitors, Spain 13 per cent, the Netherlands 12 per cent and Austria 10 per cent. In the Caribbean area Bermuda (up 28 per cent) and Puerto Rico (17 per cent increase) seem to have scored at the expense of Barbados and the Bahamas. It is symptomatic of the times that almost 92,500 of its 131,000 tourists reached Bermuda by air and 89,000 of these emanated from the United States and Canada.

Derailment on Speed Restricted Track

AT a speed estimated at 45-50 m.p.h. the 9.52 p.m. York—Swansea express, at 1.18 a.m. on February 8 last, ran on to an uneven section of line between Holmes Chapel and Sandbach on the L.M. Region main line; on it there was a 10 m.p.h. speed restriction following engineering work. Several coaches were derailed but remained in line as they came rapidly to a standstill; no one was hurt. Both tracks were extensively damaged, but the overhead electrification equipment, installed a few months previously, was not affected. In his report on the accident Colonel W. P. Reed, inspecting officer of railways, states that the engineering staff was not to blame and that the derailment was caused by the driver's failure to control the train, which passed on to the speed-restricted portion of track at excessive speed. The guard, he says, cannot have been alert; "his evidence indicates that when he, in the eleventh coach, thought of looking out of the window for the speed restriction boards, the greater part of the train had already become derailed." As to the driver, "his speed was so greatly in excess of the required restriction that no plea of misjudgment is acceptable. . . . I can only assume that for some undisclosed reason he was not alert." The circumstances of the accident have been brought to the notice of the panel of scientists and doctors which is assisting the B.T.C. in examining cases of failure of the human element.

New Signalling at AMERSHAM



By courtesy of London Transport Executive

Amersham Station on the Metropolitan Line of London Transport will become the terminus of Metropolitan Line train service when the electrification scheme from Rickmansworth to Amersham and Chesham and track quadrupling from Harrow to Watford South Junction are completed, and new signalling at Amersham has been brought into operation to deal with mixed suburban and main line traffic.

WESTINGHOUSE SIGNALLING

was supplied and it was designed and installed under the direction of Mr. R. Dell, Signal Engineer, London Transport.

The control desk has 2 push button panels; the left hand one controls the Amersham signalling, and the right hand one, when equipped, will control the signalling at Chalfont and Latimer.

Westinghouse Brake and Signal Co. Ltd., 82 York Way, London, N.1

Saxby & Farmer (India) Private Ltd., Calcutta
McKenzie & Holland (Australia) Pty., Ltd., Melbourne
Westinghouse Brake & Signal Co. S.A. (Pty.) Ltd., Johannesburg
Agents:—Bellamy & Lambie, Johannesburg

PICKFORDS HEAVY HAULAGE SERVICE

Abnormal Loads • Lifting
MOBILE CRANES FOR HIRE • Branches in all large towns

SILVER ROADWAYS LTD.

Reliable Trunk Services to all Ports

BRISTOL 8 The Grove, Bristol 1 BRISTOL 22318	LONDON 22-24 Bermondsey Wall West S.E.16 BERmondsey 4533	GLASGOW 12 Dixon Street, C.2 CITY 3381
BIRMINGHAM 323 High St., West Bromwich, Staffs. WEST BROMWICH 2801	CARDIFF 10 Dumfries Place CARDIFF 21631	LIVERPOOL 11 Old Hall Street, Liverpool, 3 CENTRAL 6366
LLANELLY Merfa Works, Llanelly LLANELLY 4302	SWANSEA Exchange Buildings SWANSEA 54171/5	NOTTINGHAM Pavilion Building, Pavilion Road, West Bridgford NOTTINGHAM 83481

THE HISTORY OF WAGONS-LITS 1875—1955

by
George Behrend, M.A., F.R.G.S.

A new 32-page illustrated book
Price 3s. 6d.

Order your copy now from your bookseller
or through the publishers

MODERN TRANSPORT PUBLISHING CO. LIMITED
3-16 WOBURN PLACE, LONDON, W.C.1

OFFICIAL NOTICE

GLASGOW CORPORATION TRANSPORT

TENDERS are invited for the purchase and removal of the following:

25—Double-Deck Motorbuses

Forms of tender with further details, obtainable from the General Manager, 46 Bath Street, Glasgow, C.2, to be returned to me not later than 10 a.m. Monday, August 1, 1960.

City Chambers,
Glasgow, C.1.

ALEXANDER ROOKE,
Town Clerk.



Published Every Friday

RUSSELL COURT, 3-16 WOBURN PLACE,
LONDON, W.C.1

Telephone Number: TELRIMUS 0303 (3 lines)
Telegraphic Address: Transpubco, Westcent, London

ANNUAL SUBSCRIPTIONS
BRITISH ISLES, 47/6; CANADA, 45/-;
ELSEWHERE ABROAD, 47/6
payable in advance and postage free

The Editor is prepared to consider contributions offered for publication in MODERN TRANSPORT, but intending contributors should first study the length and style of articles appearing in the paper and satisfy themselves that the topic with which they propose to deal is relevant to editorial requirements. In controversial subjects relating to all aspects of transport and traffic this newspaper offers a platform for independent comment and debate, its object being to encourage the provision of all forms of transport in the best interests of the community.

Wages, Modernisation and Inquisition

FOLLOWING closely on the Government's further efforts to bolster up the economy by a rise of 1 per cent in the Bank rate and a further call of 1 per cent of special deposits from the clearing banks came the announcement of agreement on the new pay structure for British Railways. It would almost seem that the financial move was dictated by Government determination to stem the spate of wages applications likely to result from this overdue concession to the railwaymen. A sum of over £40 million a year will be needed to meet this all-round increase for some 400,000 workers with effect from January 4 last, including the 5 per cent interim advance granted earlier in the year. Satisfaction has been expressed by the union leaders, who have agreed to discuss further steps to promote efficiency and so make the most of modernisation. It remains to be seen what more progress in this direction can be made; results so far have not been altogether encouraging. Mr. S. Greene, of the N.U.R., and Mr. W. J. Evans, of the A.S.L.E.F., are reported as having emphasised that their respective unions were already co-operating to the fullest extent, a fact of which there can be little doubt so far as the T.S.S.A. is concerned in view of the widespread introduction of modern time-saving office equipment. The wage increases range from 8 per cent to about 20 per cent according to grade and type of work, and the settlement follows closely the Guillebaud Committee's suggestions for raising the rates to levels comparable with those for similar work in other industries and for simplifying the wages structure.

One Harassing Condition

AN interesting feature of the agreement is its acceptance of the recommendation of a drastic reduction in wage groups. Fourteen such groups will replace a system of 40 different rates of pay for 150 grades. The new rates range from £8 8s. to £13 a week; signalmen and drivers, as being among those described by the Committee as "badly out of line," will benefit the most. In announcing an early meeting of the productivity council a statement issued after the settlement said that the Commission and the unions expressed "their common desire to convince the nation of their determination to promote the highest efficiency on British Railways." This, of course, is of the utmost importance as without the efforts of a contented staff the best-laid plans must largely go awry. Subject to one harassing condition the Commission and the unions, who are to be congratulated on this happy outcome, can now combine to make a success of modernised railways. The condition rests

MODERN TRANSPORT JULY 2, 1960

upon the exploratory work of Sir Ivan Stedeford and his three colleagues who form the so-called advisory group appointed by the Government in April with the following terms of reference:

To examine the structure, finance and working of the organisations at present controlled by the Commission and to advise the Minister of Transport and the B.T.C. as a matter of urgency how effect can best be given to the Government's intentions as indicated in the Prime Minister's statement.

The statement was made in the House of Commons on March 10, when Mr. Macmillan announced the Government's acceptance of the objective underlying the Guillebaud report. The industry, he said, must be of a size and pattern suited to modern conditions and prospects. The railway system must be remodelled to meet current needs and the modernisation plan must be adapted to this new shape.

Doubts and Frustration

TO the dangers inherent in this decision we pointed at the time, and they were subsequently ventilated in Parliament, when the terms of reference were described by the Minister of Transport as "flexible and wide." The advisory group, he said, would be in continuous consultation with himself and he "would be seeing them every week or fortnight." There would be close contact with the unions and the Commission; the report would not be published and interim proposals could be implemented. The aura of mystery which has since surrounded the labours of the group would be no disadvantage if one could be sure of their ultimate benefit. There are, however, signs that its task is proving a difficult one. This is not surprising in view of the complexities of railway administration and the absence from the group of anyone qualified to advise it on this subject; moreover the inadvisability—if not impracticability—of the Government's proposals are no doubt becoming increasingly clear. Numerous meetings are known to have been held between the group and members and sections of the B.T.C. organisation whose normal—and urgent—work must be seriously impeded by pre-occupation with the inquiry. Not only this; the doubts engendered among responsible railway officers as to the future of the modernisation scheme are undoubtedly causing frustration and despondency at the very time when their activities should be directed towards bringing success to the enterprise.

Modernisation in Jeopardy

THE progress of the plan itself may be seriously jeopardised. For example, steel for diesel locomotive crankshafts is on 14 months' delivery, so that locomotives required in 1962-63 have now to be advised to the manufacturers even if definite orders and specifications are not yet placed; any interruption in this process would be serious. There has been talk also of damping down electrification. British Railways has evolved a 50-cycle system which is highly suited to this country and ought to be extended as rapidly as possible. And not only over the main lines already in the plan—Euston to Liverpool and Manchester and, later, Kings Cross to the West Riding—but also up the East Coast at least to Newcastle and possibly to Edinburgh and Glasgow, and up the West Coast to Glasgow and Stirling. The recommendations of the advisory group are to be presented to the Government in time for the introduction in the autumn of legislation to effect the reorganisation of the structure and finances of the Commission. One of the avowed objects is to make the regions self-supporting, as though it were wisdom on a unified railway system to decentralise such activities as central purchase, design and allocation of motive power, rolling stock, signalling and other equipment essential for efficient operation. There is ample evidence that our national railway system is already being administered in small enough units; an article in our last issue described, for instance, what is being done in the Barnsley area of the Eastern Region to effect material savings by a scheme based essentially on local knowledge of traffic working. Such plans are devised to meet the pressing need for an up-to-date railway system; it is to be hoped they will not suffer from the contemplated reduction of expenditure in the public sector and that the group will refuse to support drastic and ill-timed pruning.

NEWS SUMMARY

THE report of the British Transport Commission for 1959 shows a reduction of £6.1 million in the working deficit on British Railways and the working surplus of the other undertakings rose by £9.4 million to £29.4 million. (Page 13.)

Final agreement was reached on June 24 on the introduction of the new pay structure for British Railways. Retrospective payment of the new rates will be to January 4 of this year.

The Minister of Aviation has announced that Lord Terrington, chairman of the Air Transport Advisory Council, has accepted his invitation to act as chairman of the new Air Transport Licensing Board.

It is understood that the Minister of Transport is unable to approve the increase in gross

weight of four-axle road tankers from 24 to 28 tons. The principal reason is that, despite modern bridges having the necessary strength, there is a large number of older bridges which would be seriously affected. It would take a considerable time to bring these up to the strength required regularly to bear such loads.

The Minister of Transport on June 27 formally started work on the construction of the second Blackwall Tunnel. (Page 8.)

The British Overseas Airways Corporation has placed an order for 10 Vickers Super VC10s. (Page 14.)

Details have been announced of the merger between Airwork and Hunting-Clan Air Transport as British United Airways. (Page 9.)

Acceptance has been recommended to London busmen by their negotiating representatives of revised proposals for a bonus scheme. (Page 4.)

CREWE BUS STATION OPENED

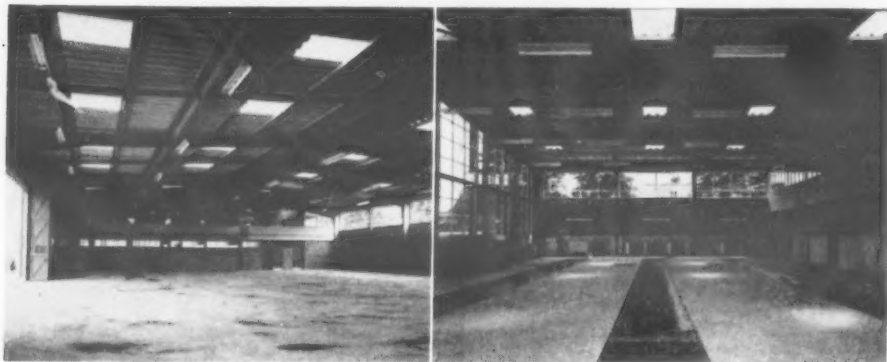
*Important Crosville Contribution to
Town Redevelopment Scheme*

COMBINED WITH GARAGE

BRIEFLY described in our June 25 issue, Crewe's first bus station, built by Crosville Motor Services, Limited, was officially opened on June 21 by the Mayor, Councillor S. Orwell, J.P. Conveniently situated in the modern shopping centre, it is not only an important improvement affecting thousands who travel in and around Crewe

will now be garaged and repaired in the station and the majority will stand under cover.

As well as providing improved and more convenient facilities for the public, the new buildings will give better working conditions for the staff transferred from Queen Street and from the company's former offices in the Square. In designing the station, the layout was carefully planned in conjunction with the town centre development,



Interior of the garage of the new Crosville bus station at Crewe; right, the bus repair bay

daily, but it is a principal feature of the town redevelopment scheme and provides an exciting and attractive architectural prospect, as is seen in one of the accompanying illustrations.

The mayor, who is a passenger guard on British Railways, having joined the railway in 1918, formally opened the premises by cutting a tape at a ceremony attended by aldermen, councillors and chief officers of the borough. He was offered the scissors for the purpose by Traffic Inspector David Mellor, who joined the L.N.W.R. in 1913, but became a Crosville conductor in 1921 and is understood to be the oldest serving member of the company's staff in the Crewe Division. Mr. Maurice Holmes, chairman of the Tilling Group and of the Crosville company, presided. He was accompanied by other Crosville directors and the senior officials, headed by the general manager, Mr. Bernard Griffiths.

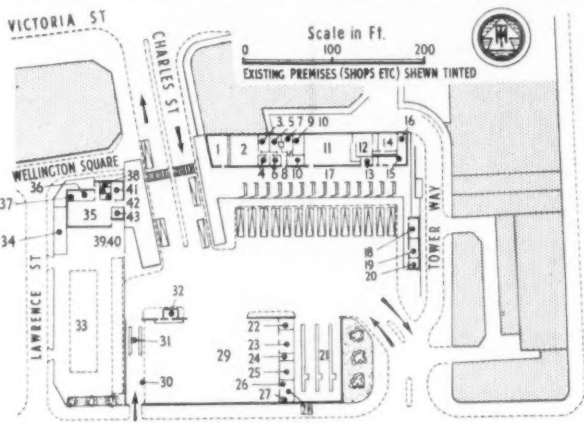
The new station will deal with all country bus services in and out of Crewe operated by Crosville, the North Western Road Car Company, and the Potteries Motor Traction Company. In addition, all the town services, also run by Crosville, will pass through the station to pick up and set

some of which was completed before building started in April, 1959. The site, which is nearly 10,000 square yards in area, was formerly occupied by dwelling houses. It was scheduled for development as a bus station under the Crewe town planning scheme and was purchased by Crosville from the Corporation. Its proximity to the new shopping centre will doubtless benefit traders as well as shoppers.

The office block, on the north side, contains an inquiry and booking hall; parcels, left luggage, and lost property offices; a spacious public cafe; a newspaper kiosk; divisional administrative offices; and a paying-in room for conductors. In a separate building at the west end there is a staff canteen with an adjoining car park and cycle accommodation.

Routing

The main passenger entrance is on the east side of the station where steps and a ramp for perambulators lead up from Tower Way, giving direct access from the shopping area. Buses will enter and leave the station via



Layout of the new bus station and garage at Crewe

- 1 Conductors' pay-in; 2 general office; 3 typists; 4 depot superintendent; 5 staff lavatories; 6 inspectors; 7 staff lavatories; 8 entrance lobby; 9 schedules; 10 divisional manager; 11 cafe; 12 servery; 13 kiosk; 14 parcels, lost property; 15 inquiries, tours, etc.; 16 private hire; 17 covered waiting area; 18 public toilets (women); 19 public toilets (men); 20 sub-station; 21 engineering repair bay; 22 foreman; 23 general store; 24 oil store; 25 tyre store; 26 cleaners' store; 27 staff lavatories; 28 staff lavatories; 29 garage; 30 fuel pumps; 31 bus washing machine; 32 garage foreman; 33 car park; 34 cycles; 35 canteen; 36 kitchen and servery; 37 store; 38 fuel store; 39 boiler house; 40 staff lavatories; 41 staff lavatories; 42 entrance; 43 staff lavatories

Delamere Street and via Victoria Street through Charles Street. The town services running in both directions will call at passenger platforms close to the Victoria Street entrance. The other services will start and terminate at 14 loading and unloading



View of the new bus station from Crewe clock tower

down passengers. It is estimated that it will handle annually over 300,000 bus departures and some six million passengers.

Hitherto, the buses have operated from stands in Crewe Square, Prince Albert Street, and Chester Street, so that passengers changing from one service to another have had as much as 350 yards to walk. In future all inter-connections between services will be made in the bus station with much greater convenience and under cover. A frequent bus service to and from the modernised railway station will put the surrounding country districts within easy reach of passengers leaving from or arriving at Crewe by train. Of a fleet of 1,200 vehicles owned by Crosville, 54 are operated from Crewe and have previously been garaged at Queen Street—half a mile from the stands. These vehicles

bays alongside the main office block. All the passenger accommodation is under canopies.

The garage block, which runs alongside Delamere Street, has covered accommodation for 30 buses; there is a separate maintenance bay in which six vehicles can be serviced on three excellent pits simultaneously. Fuelling points and an up-to-date bus washing plant have direct access from Delamere Street. The fuel storage tanks total 15,000 gal. capacity. The engineer's men also have a staff messroom, and the accommodation is rounded off by a foreman's office and a parts store. The accommodation here offers a great improvement over the conditions prevailing in the former garage in Queen Street.

The garage is constructed mainly of steel frame (Continued on page 10)



Emergency is the test of real efficiency

All the road safety precautions in the world cannot prevent an accident in a situation like this—but good brakes can! Ensure that *your* vehicle is equipped for all emergencies by fitting Clayton Dewandre braking equipment.

CLAYTON DEWANDRE CO. LTD.

TITANIC WORKS • LINCOLN • ENGLAND • TEL: LINCOLN 25272
AP 35



BIG JOBS
CALL FOR
BIG TIPPERS....

...LEYLANDS MOVE 3,000 CU. YARDS OF EARTH DAILY

"Why use small-capacity tippers on large earth-moving contracts?" That's the question Richard Biffa Ltd., Contractors of Wembley, asked themselves when quoting for earth-clearance from larger sites. The answer was "don't"—instead use Leyland multi-wheelers and get the job done quickly. That's what they did—and daily output soon exceeded 3,000 cu. yards, rising on some days to 3,800.

Leyland 8-wheeled, 14 cu. yard Octopus tippers and 6-wheeled, 12 cu. yard Hippos did the job—and what a job!

Taking 12-14 cwt. grab loads dropped from a height of 9 ft., they operated a 56-hour week in severe conditions over unconsolidated ground and worked a vehicle turn-round of one per minute—treatment that would knock the heart out of any ordinary truck. But not Leylands. Output was maintained until the site was cleared, with a fuel consumption of 6.9 m.p.g. for the Octopuses and 7.1 for the Hippos. Small wonder that this operator's fleet consists almost entirely of Leylands—six of which, incidentally, have each covered over half a million miles... and still look good for many thousands more.

Leyland 20 TON HIPPO & 24 TON OCTOPUS
The big tippers for better service

LEYLAND MOTORS LTD • LEYLAND • LANCs

Sales Division: Hanover House, Hanover Square, London, W.1.

Telephone: MAYfair 8561

LORRY—BUS—COACH

Brighton Agreement Soon

AT the annual general meeting of Southdown Motor Services, Limited, the chairman, Mr. T. R. Beddow, traced the history of, and welcomed, the prospective Brighton area co-ordination agreement. In 1957, he recalled, the board received an invitation from Brighton Corporation to join with a special transport committee, which the corporation had set up some three years earlier, to consider a scheme for public passenger transport within Brighton and Hove and the surrounding areas, and to make recommendations for a suitable replacement of the agreement scheduled to the Brighton Corporation (Transport) Act, 1938, in which Southdown's territorial rights, dating back to 1916, had been incorporated. The Brighton, Hove and District Omnibus Co., Limited, also a party to the 1938 agreement, received a similar invitation. The board was pleased to accept this invitation, and, after much exploration of ways and means by which the public's passenger transport needs within the area could best be met by a scheme of co-ordinated services provided by the three operators, agreement in principle had been achieved.

A new agreement to replace the 1938 agreement will shortly be executed, and will provide for a fully co-ordinated scheme of omnibus services within an area bounded by Shoreham in the west, Telscombe Tye in the east, and inland to the crest of the Downs; under this new agreement each of the three parties will retain its identity and own internal administration, but there will be a common pool of traffic operation and a common pool of traffic revenue and mileage to be shared in agreed proportions. The area of exclusive operation established by Southdown will disappear, and likewise the obligation on the company to charge protective fares in the area of operation of Brighton Corporation and the Brighton, Hove and District company. The board is confident that these arrangements are in the best interests of the travelling public and of the operators. This scheme for the Brighton area follows the pattern of the 1946 co-ordination scheme for the Portsmouth area.

Bus Station Now a Tight Fit

MODERNISATION of Leeds Central bus station, off Eastgate, is under consideration. Double-deck buses are now larger than when the bus station was first built and any reconstruction scheme is likely to include widening of the roadways between the platforms and the lifting of the covered ways.

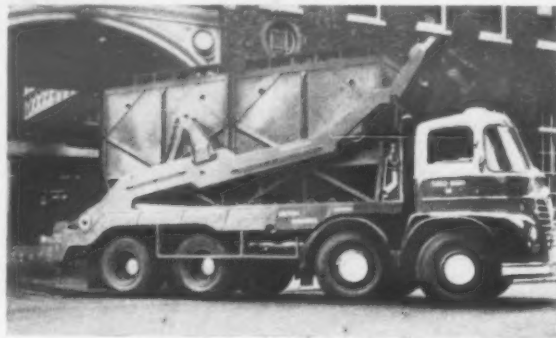
Mulley Loses Appeal

THE Minister of Transport has disallowed appeals lodged by Mulleys Motorways, Limited, against the decision of the Eastern Area Traffic Commissioners authorising an increased vehicle allowance to H. C. Chambers and Son, Limited, and H. S. Theobald and Son on excursions and tours starting from Sudbury and Long Melford respectively. He considers that on occasions during the summers of 1958 and 1959 both Theobald and Chambers had been unable to carry on their excursions and tours all the passengers who wished to travel with them

and that, for 1960, some small easements of the restrictive conditions attached to their licences were therefore desirable in the public interest. It would be against the interests of the travelling public to defer a decision until Mulley had had an opportunity to redevelop the business it had taken over from Corona Coaches, Limited.

Wallace Arnold Complaint

RISING cost of new coaches is deplored by Mr. Robert Barr, chairman of the Barr and Wallace Arnold Trust, Limited, in his annual report. Every year, he says, there is a steady increase in the cost of a complete vehicle; coach bodies now cost considerably more than the chassis. There has, in fact, been a 25 per cent increase in the cost of coach bodies in recent years. With higher productivity, prices might have been expected to reduce rather than increase. This had not been so in their experience. Unless the price of



Experimental London Midland Region self-loading container vehicle referred to on this page. It is delivering malt in bulk

new vehicles was kept within reasonable control, purchases would have to be restricted. In many cases it was cheaper to hire a Continental coach than to use a Wallace Arnold coach on the Continent because of the high capital cost of replacement. Consequently they were operating more and more tours of this type.

Warm-Hearted Nottingham

NOTTINGHAM is the latest municipal undertaking to agree to instal heaters in the cabs of existing buses, 109 of them, at a cost of £1,150, because drivers have complained that they are cold in winter.

Jack Committee Completes Visits

WEDNESDAY this week saw the completion of the programme of visits which the Committee on Rural Bus Services has set down for itself. This was a visit to Switzerland. The committee has also been to Sweden and to East Anglia, the South West, Wales, the North East

and Scotland to hear local views of rural bus services. Unless it decides to seek amplification on any point it is unlikely to hear any further evidence. It was recently stated in the Commons that the report of the committee is expected to be in the hands of the Minister in the autumn.

Railway Bulk Container Lorry

FOR several weeks the London Midland Region has had in service its experimental self-loading container road vehicle suitable for road-rail transfer operations. The vehicle, a Foden K-type eight wheeler with two-stroke engine, is fitted with hydraulic lifting arms of Benne-Marrel type and it mounts two 4½-ton capacity containers, as seen in the accompanying illustration. The unladen weight is about 11 tons. The containers are discharged over the rear and can be tipped if desired. There is also an air-pressure discharge system for cement or similar traffic. The



Foden is at present working in the London area from St. Pancras goods station and it is understood that a second experimental vehicle is planned.

Conductors for School Buses

CHESHIRE Education Committee has agreed to the employment of conductors on hired school buses where the driver has no control over the door. Vehicles of the station wagon type with up to 15 seats will be exempt from the decision.

London Carrier Consolidates

APPLICATION has been made to the Metropolitan Licensing Authority by A. Packham and Co., Limited, under section 12 of the 1933 Act, for an A-licence in respect of 16 vehicles of which 13 were licensed to its subsidiary, Griffin Brothers (Haulage), Limited, which occupies its depot at Highbury. The normal user for the three articulated vehicles ex-Packham would include general goods, mainly smalls, between London and

West Country depots (for one vehicle) and between West Country, South Coast depots, and to Birmingham (two vehicles) and for the remaining 13 vehicles general goods, London and the Home Counties. Also sought are two B-vehicles for maintenance purposes in substitution for a like number of B-vehicles licensed to Griffin.

Road Haulage Wage Claim

A CLAIM for a £1 per week increase was lodged this week with the Road Haulage Wages Council. The unions are also asking for an increase in subsistence allowances and in the hourly rates for casual workers.

B.R.S. Resists Comparability with B.T.C.

IN recent negotiations with the trade unions respecting a claim by supervisory and clerical grades for an interim 5 per cent wage claim, back-dated to January 11, British Road Services has stated that it could not accept that it should be linked with other sections of the B.T.C. as to wage levels, but that its position must be considered comparable only with independent road hauliers. B.R.S. conceded a 5 per cent increase but only from February 29 and the discussions have only been referred back to the management.

London Bonus Scheme Commended

LONDON busmen's delegates were this week strongly recommended by the committee negotiating with London Transport to accept a revised incentive bonus scheme and also to agree to the introduction of the first one-man bus routes in the Central area—routes 201, 215, 215A, 216, 218, 219 and 264 in the Kingston area, which are at present operated by two-man crews. London Transport has proposed a shorter working day on Sunday, 7 hr. 40 min. instead of 8 hr., with spread-over reduced from 9 hr. 40 min. to 9 hr. This will entail a reduction of 3½ per cent in Sunday services. Drivers of one-man Central area buses will get 15 per cent, or £1 12s. per week, more than the normal minimum. 40 per cent of the conductors' wages saved will be paid into the incentive bonus pool to be divided among all busmen.

Also paid into the pool will be 35 per cent of the takings in excess of a periodically readjusted target figure for revenue. For the first 12 weeks, a token bonus will be paid, approximating to the normal expectation. It will be 5s. 3d. a week in Central London, 4s. 9d. in the suburbs and 4s. 6d. on country routes. Further payments will be made for timekeeping, quality of service and freedom from accidents. London Transport is also offering higher pay for especially early and late duties.

Bus and Coach Developments

Huater Bros. (Tantobie), Limited, applies for the licences of John Hunter, Tantobie.

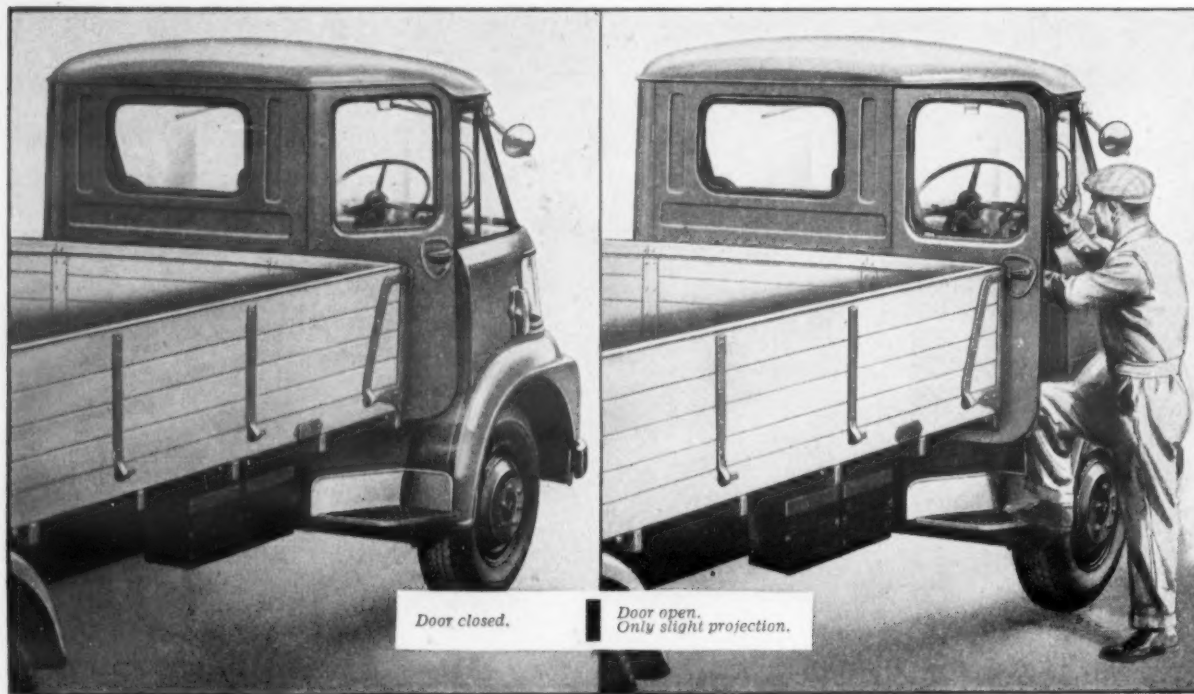
Bannatyne Motors, Blackwaterfoot, seeks the licences of Stewart's Motors, Corrievue, Lamlash, Arran.

Littleborough Motors, Limited, applies for the excursions and tours from Littleborough of Richard Jay, Limited.

Eastern National Omnibus Co., Limited, proposes a service between Basildon (Town Centre) and Pitsea Station via Southernhay, Long Riding, Gale's Corner and Vange.

Northampton Corporation and United Counties Omnibus Co., Limited, propose a joint service between Abington Street and Cotswold Avenue via Wood Hill, Marefair, Weedon Road, Duston Road, Bants Lane and Chilterne Avenue.

Ribble Motor Services, Limited, Tom Jackson (Chorley), Limited, and W. Simm and Sons, Limited, apply for a joint group of excursions and tours from Chorley, Coppull, Standish, Heskin and Croston to replace the groups at present licensed separately to the three companies.

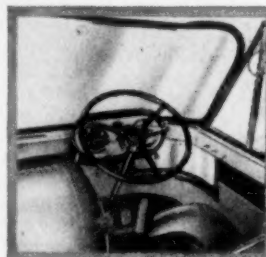


Door closed.

Door open. Only slight projection.



... easy access



... all-round vision



... corner lights



12 MONTHS' WARRANTY
backed by B.M.C.
—the most comprehensive
Service in Europe.

MORRIS

ANGLE-PLANNING

gives you

SAFETY

DOOR OPENING

A new concept of safety for your fleet drivers! Rear hinged doors which project only an inch or two beyond vehicle line when fully open. Traffic can pass safely... no interference with pedestrians. And—so easy is access—there's a tremendous saving in time and effort needed on multi-call deliveries. Extra safety, too, in the all-round vision with floor windows, making manoeuvring simpler, safer, saving time on turn-round. And—further time saver—a low-load platform to speed goods handling. With driver efficiency features such as four-way seat adjustment, twin link-driven wipers, twin exterior mirrors, practical lighting control, direct view instrument panel, servo braking. Plus choice of diesel or petrol engines for economical power. So much that's new... and new low prices, too. Get full information from your Morris dealer.

All this—and lower prices too!

Catalogue on request. Please mention capacity that interests you.

you're loads better off with

MORRIS

angle-planned vehicles

1½, 2, 3 & 4
TONNERS

THE NEW DIESEL PULLMANS

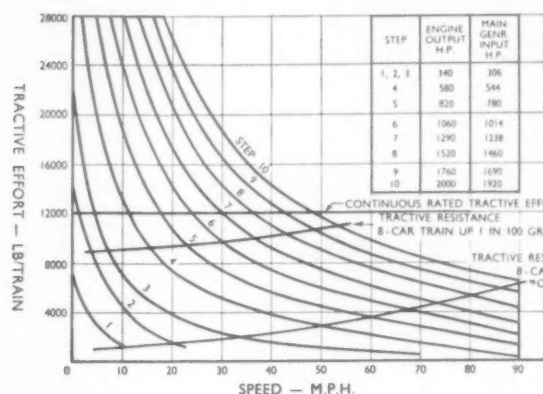
G.E.C.-N.B.L. Power Equipments

WESTINGHOUSE BRAKES AND STONE AIR CONDITIONING

IN our last issue we published a general description of the five new six- and eight-car diesel-electric Pullman trains designed and built by the Metropolitan-Cammell Carriage and Wagon Co., Limited, for operation by the London Midland and Western Regions of British Railways. The present article gives technical details of the principal items of equipment, which include main power equipments supplied by the General Electric Co., Limited, comprising N.B.L.-M.A.N. diesel engines, generators, traction motors, spring drives and control gear; auxiliary power, lighting and air-conditioning equipment supplied by J. Stone and Co. (Deptford), Limited, powered by Rolls-Royce horizontal diesel engines; and

control switchgear cabinet stands against the main end wall of the generator compartment. Traction motor field divert resistors are mounted on top of the cabinet and the generator automatic field regulator resistances are in the compartment roof. A small cabinet containing auxiliary switchgear is accommodated in a short passageway at the other side of the compartment giving access to the adjacent guard's and luggage compartment. The engine generator set is said to be extremely light for the power output and makes possible the very high performance of the trains.

The diesel engine, with 12 cylinders of 180-mm. bore by 210-mm. stroke, is fitted with a Napier exhaust-gas turbocharger giving a boost pressure of 10.4 p.s.i. and has a 12-hr. rating of 1,000 h.p. at 1,500 r.p.m. Two C.A.V. fuel injection pumps mounted in the vee formed by the cylinder blocks are driven in tandem from a gear drive on the camshaft. The camshaft is driven by spur timing gears at the flywheel end. Cylinder heads incorporate precombustion chambers and are each fitted with two inlet and two exhaust valves. A hardened alloy steel crankshaft is carried in seven copper lead steel-backed bearings and similar bearings are used for the connecting rod big ends. Engine fuel is pumped from a main supply tank to the service tank by a belt-driven Dowty pump of 90 gal. per hr. capacity. A hand-operated pump is also fitted. The lubrication system is pressure-primed by a Mirreless V32-3 pump driven by a G.E.C. motor. Main-engine governors are by Ardleigh Engineering, Limited, Colchester.



Train performance curves

the latest type of two-stage electro-pneumatic brakes by the Westinghouse Brake and Signal Co., Limited.

The form of integral construction employed in the coaches by Metro-Cammell represents the culmination of many years of development. Much of the bodywork is built of low-alloy corrosion-resistant steel of high strength, with extensive use of spot welding, and despite the great amount of special equipment carried, the design gives low weight with great strength, permitting high speeds and great operating economy. To ensure quiet and comfortable riding, the body structures are heavily insulated in the roof, sides and floor against heat and sound, while the floors themselves are fully suspended on rubber and free to float independently of the main structure.

Both motor and trailer bogies are of the all-welded Metro-Schlieren type specially developed by Metro-Cammell for these trains. The primary suspension is based on the Schlieren unit, already well proved and selected for many important Continental trains, which employs a robust telescopic guiding and damping system within the helical spring housing to control axle movements. An outstanding feature of the Metro-Schlieren bogie is a capacity to retain a high standard of riding over large mileages with very little maintenance. To ensure its suitability for British Railways operating conditions, six of the new-type bogies have been undergoing comprehensive tests under varying conditions with British Railways for 12 months, during which much valuable and advanced data have been collected and assimilated.

G.E.C. Power Equipments

The 10 main power equipments supplied by the General Electric Co., Limited, are designed for a maximum service speed of 90 m.p.h. The diesel engines, cooling groups and engine accessories were supplied by the North British



The Metro-Schlieren bogies; left, a motor bogie and, above, a trailer bogie

Locomotive Co., Limited, as sub-contractor to the G.E.C. As described last week, three of the new trains are composed of eight vehicles and two of six vehicles. All have a power car and driving cab at each end, the traction equipment in both cars being controlled simultaneously from either cab over a control line running through the train. At each end of a train formation there are two traction motors in the inner bogie of the power car and two in the adjacent bogie of the vehicle coupled next to it, making eight motors in a train of either six or eight coaches.

Immediately behind the cab in each power car is a Serck radiator unit, a built-up structure providing a central tunnel-shaped passageway with side ducts housing the cooling elements for the engine water and the lubricating oil heat exchanger. At the top of the unit is the header tank and the housing for the 45-in. dia. fan, which is driven at variable speed by a Serck-Behr hydrostatic drive. The fan is coupled to a hydraulic motor which is fed with oil from an engine-driven pump through a by-pass valve. A thermostatic control causes the valve to by-pass the oil to a supply tank until the minimum operating temperature is reached by the coolant. Thereafter the same control causes the valve first to open the shutters and then to divert oil to the fan motor, so that the fan speed rises with increasing engine temperature and varies automatically with coolant temperature changes.

Main Diesel Engine

Beyond the radiator unit is the engine-generator set, consisting of a N.B.L.-M.A.N. 12-cylinder (Type L12V18 21BS) vee engine direct-coupled to a G.E.C. main generator with overhung auxiliary generator, the whole set being carried on anti-vibration mountings. A bulkhead separates the engine from the generators. A main traction con-

amp. 523 volts, 1,500 r.p.m. 650kW, and of the auxiliary generator 91 amp. 110 volts, 650-1,500 r.p.m. 10 kW.

The voltage output of the auxiliary machine is controlled over the whole engine speed range by a Newton carbon-pile voltage regulator. This generator supplies excitation for the main generator separately excited field and current for battery charging, control circuits, compressor and oil priming pump motors and cab heating. Cab lights and marker lights are supplied at 24 volts d.c. through transformer-rectifier units from the auxiliary diesel alternators.

Traction Motors and Drives

The new trains are the first diesel units on British Railways to have fully spring-borne traction motors. Two flanges are provided on each motor through which it is bolted to the vertical face of the bogie transom. With this arrangement the gearwheel cannot be mounted directly on the axle in the usual way because the distance between the motor pinion and gearwheel centres varies with the action of the bogie springs. This relative movement is allowed for by a Brown-Boveri spring drive, which consists of a short quill shaft clamped to the motor frame at the driving side, the driving axle passing through the quill, which is shaped to allow clearance for axle movements, particularly vertically, and a gearwheel rotating in roller bearings on the quill, so that the distance between the motor pinion and gearwheel centres is fixed.

The necessary flexible coupling between the gearwheel and the driving axle is provided by a spider pressed on to the wheel hub, with its arms projecting inside the gearwheel. Torque is transmitted from the gearwheel to the spider through coil springs inside the gearwheel which bear at one end

(Continued on page 6)

High speed service runs on SKF

The introduction of the first of the new diesel electric Pullman trains, the "Midland Pullman" means faster, smoother travel between London and Manchester. These new train sets are built by Metropolitan-Cammell with N.B.L.-M.A.N. engines and G.E.C. electrical equipment. The "Midland Pullman" is scheduled to cover the 190 miles journey in three and a quarter hours. SKF spherical roller bearing axleboxes have been chosen for all the trains thus ensuring smoothness and absolute reliability in operation.



SPHERICAL ROLLER BEARING AXLEBOXES

THE SKEFKO BALL BEARING COMPANY LTD · LUTON · BEDS
OVER ONE MILLION SKF ROLLER BEARING AXLEBOXES HAVE NOW BEEN SUPPLIED TO THE RAILWAYS OF THE WORLD



A total of thirty-five 3,300 h.p. 25 kV a.c. locomotives, together with forty sets of locomotive electrical equipment, have been ordered from AEI by British Railways.

Please send enquiries to AEI Traction Division, Trafford Park, Manchester, 17, or to your local AEI Office.



Traction Division
Manchester · Rugby · London

Associated Electrical Industries Limited

The Diesel Pullmans

(Continued from page 5)

against the gearwheel spokes and at the other end against the spider arms, the contact at both ends being made through spring cups.

The traction motors are four-pole self-ventilating machines with a rating of 425 amp., 383 volts, 190 h.p. at 1,360 r.p.m. Gear ratio is 19 to 67. The two motors in each power bogie are in parallel. Those in the second vehicle from each end of a train are supplied through power cables from the adjacent power car. Their field divert resistors are mounted on top of the power car traction switchgear cabinet.

Basically the method of control consists of select-

As in the Type 1 and Type 2 North British diesel electric locomotives with G.E.C. power equipments, the automatic load regulator takes the form of an oil-operated vane motor driving rotatable brushgear round a fixed commutator, the segments of which are connected to the regulating resistances in the main generator separately excited field circuit. When the generator load varies with the track conditions it tends to alter the speed of the diesel engine, which causes movement of the governor to maintain constant speed conditions by admitting oil to the vane motor so that it rotates in the direction necessary to decrease or increase the generator

troller has a selector handle with forward, engine start, off and reverse positions and the usual interlocks are provided. All power contactors are electro-pneumatic. The reverser consists of two air-operated cam groups. A master motor cutout switch with cam-operated contacts is located at the side of the traction switchgear cabinet and enables the traction motors to be isolated singly or altogether. Warning lamps in the generator compartment brighten to indicate low water level, high water temperature, low oil pressure, overload and earth fault. The engine is slowed automatically to idling in the event of high water temperature, overload or earth fault; earth fault also disconnects the main generator separately excited field from the auxiliary supply and introduces a discharge resistance by means of a changeover contactor. Two indicator lamps on the driver's instrument panel brighten to show engine stopped, or a general

the G.E.C. has gained valuable information from the train performance computer at its Witton Engineering Works. This is based on a computer developed at the Manchester College of Technology, but incorporating certain modifications introduced at Witton which experience has shown to be useful, such as means for simulating the effect of a driver moving his controller handle while a 'run' is in progress and automatic allowance for increased train resistance while coasting. With the help of this device it has been possible to forecast the performance of the trains on all the routes they will cover. Experience with the computer in connection with Type 1 and Type 2 diesel-electric locomotives equipped by the company has shown the close correspondence between the forecast and actual performances.

For the present purposes the runs were simulated on the basis of full power being used throughout except where there are permanent speed restrictions, the computer operator observing these by manipulating switches to represent braking and coasting. The chart produced by the computer (reproduced on page 5) shows the speed at any part of the run together with overall and point to point times. A practicable schedule for regular public service is arrived at by adding a certain recovery time to allow for signal checks, permanent way repairs and other delays which may arise.

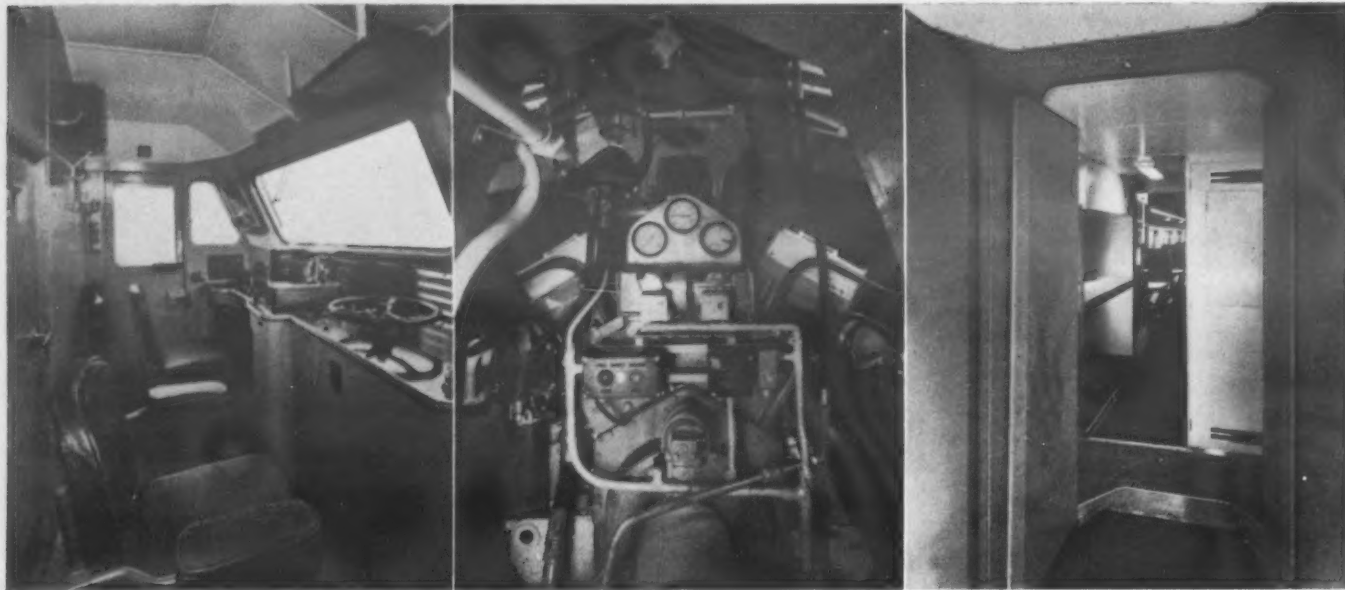
Two-Stage Braking

Westinghouse two-stage electro-pneumatic brakes developed for the new trains have been designed to provide smooth and rapid stopping from high speed. The e.p. brake is generally similar to that already in use on many British Railways and Underground electric trains. It provides simultaneous operation of the pneumatic brakes on every coach through electrical control by means of solenoid-operated valves in the coaches linked to the driver's controller through the train wires. In addition, the system provides progressive brake application and release. An indicating lamp in the cab proves the current supply to the electro-pneumatic brake. The standard Westinghouse automatic air brake is embodied in the system as a standby service brake and is applied by appropriate movements of the single driver's brake controller handle. Furthermore it will apply automatically on all coaches if a train should break apart or if a guard or passenger wishes to stop the train in an emergency.

The trains are fitted with cast-iron brake blocks, a characteristic of which is that the friction coefficient increases considerably as the speed of a train decreases when the brakes are applied. This means that if a high braking force is used as is desirable when running at high speeds, then this high brake force is likely to cause skidding of the wheels at low speeds. Unless special precautions are taken it is usually necessary to place a limit on the braking force in order to avoid this possibility and, as a result, a longer distance is required in which to stop a train from high speed. The Westinghouse two-stage brake overcomes this limitation and enables the train to be stopped in a shorter distance. This is achieved by automatically increasing the brake force at high speeds and automatically reducing it as speed falls to a safe level for low-speed running. The speed control feature is operative for all types of brake application and is entirely automatic, the higher brake force being available above a predetermined speed, when a second indicating lamp in the cab lights up.

The brake equipment employed is of compact

(Continued on page 7)



View into the driver's cab, main engine compartment of power car viewed from cab doorway and, extreme right, view through Metro-S.I.G. gangway into first-class parlour car

ing eight different engine speeds between idling and 1,500 r.p.m., at each of which the corresponding output is available over a wide range of train speeds by the action of a governor-controlled generator field regulator, supplemented in the appropriate conditions by one step of traction motor field diversion. On the first two power positions of the controller the engine runs at idling speed and generator excitation is controlled by fixed resistance steps. On notch 3 the automatic regulator becomes operative with the engine still at idling speed and remains in action on the remaining seven notches, on each of which the engine speed and output are increased in graded steps. Engine speed control is effected by the action on the governor of three solenoids which lift in different combinations according to the energisation through the master controller contacts. This method provides exactly synchronised control of the power units at both ends of a train.

excitation. Field-weakening of the traction motors takes place in the appropriate conditions under the control of a transition relay in the generator field circuit. When this operates, the load regulator moves back towards minimum excitation and the weakfield contactors close when the generator voltage and current have been adjusted to the correct values. Full field is restored automatically when appropriate by transition current relays in one motor circuit of each power unit.

A current limit relay arrests the increase of generator excitation by the automatic load regulator during acceleration of the train if the current exceeds a predetermined setting. When the current falls, with rising train speed, to the relay drop-out value the increase of excitation is resumed under the normal control of the load regulator. The relay thus ensures that damaging wheel slip is avoided when accelerating under poor adhesion conditions.

In addition to the power handle the master con-

alarm. They operate in case of trouble in either power car, the fault being localised by inspection of the individual power car fault panels.

The only auxiliary machines are the oil priming pump motor and the motor driving the compressor for the Westinghouse automatic electro-pneumatic brake and control air supplies.

Eight power cables connected between the power car and auxiliary power cars at each end of the train supply the traction motors on the auxiliary power car. The 36-line control cable running throughout each train is conveyed between coaches by jumpers and receptacles with butt contacts. This form of receptacle avoids difficulties experienced with plug and socket types when plugs become misaligned; it is being supplied by the G.E.C. in quantity for British Railways multiple-unit electric stock under the British Railways 50-cycle electrification programme.

Throughout the project, the traction division of

BRITISH RAILWAYS

Diesel Electric Pullman Trains



BUILT BY



FOR THE PULLMAN CAR CO. LTD.

INTEGRAL TUBULAR
CONSTRUCTION

QUIET RIDING

METRO-SCHLIEREN BOGIES

SPECIAL GANGWAYS

AIR-CONDITIONING

ADJUSTABLE RECLINING
SEATS

Metropolitan-Cammell Carriage & Wagon Co. Ltd.

HEAD OFFICE: SALTLEY · BIRMINGHAM 8

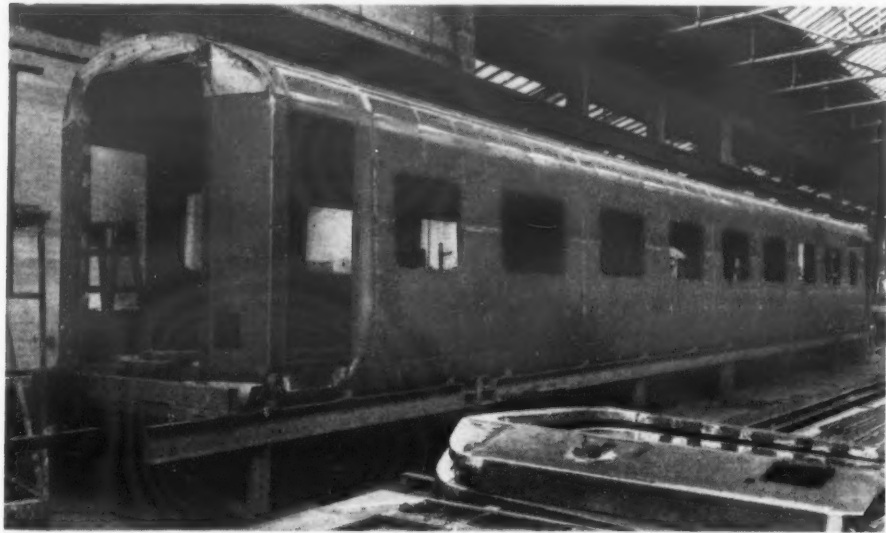
::

LONDON OFFICE: VICKERS HOUSE · BROADWAY · WESTMINSTER, S.W.1

design, making use of diaphragms, soft-seated valves and O rings in order to reduce wear and facilitate maintenance. The brake cylinders embody mechanism to adjust the brake rigging automatically and maintain constant clearances between brake blocks and wheels as the blocks wear. Two Westinghouse air compressors are carried on each train and they are assembled with the ancillary fittings as compact units designed specially to fit within the restricted space available beneath the power coaches.

Auxiliary Power

Power for the Stone-Carrier air-conditioning equipment and for lighting the train is obtained from two auxiliary power units mounted on the underframes of the cars situated next to the motive power cars, that is on the kitchen cars on the six-car trains and on the second-class parlour cars on the eight-car trains. Each auxiliary power unit consists of an engine-driven Tonum alternator with its associated switchgear, arranged to supply feeder mains running the length of the train. The two feeder systems are separate and distributors are tapped off at each car. The alternators are controlled by Stone automatic carbon-pile voltage regulators. One power unit is sufficient for summer cooling and normal heating conditions, but both units are required for extreme winter conditions. Under normal conditions one power unit acts as a standby. Automatic control gear is provided to ensure that priority loads are connected to the first power unit to be started up. Additional loads are supplied by the second power unit. The shutting down of the first power unit automatically sheds the priority load on to the second power unit. Starting and stopping the engines is controlled by push buttons



Shell of second-class parlour car under construction

in the same car as the auxiliary power unit. The current for the control circuits and starting motor is provided from a 24-volt battery. The Stone-Kheops intercar couplings must be inserted throughout the train before the feeder contactors can be closed. Any break in the coupling circuits immediately disconnects the feeder mains from the power units, thus ensuring that exposed coupling pins are safe. Provision is made for operation of the equipment from an external three-phase a.c. supply while the train is stationary. A comprehensive system of protective devices embodying visual warning is provided to safeguard the electrical and mechanical apparatus and Smith-Stone track speed indicators and distance counters are fitted to the motive power cars.

Engine-Alternator Set

Each set comprises a Rolls-Royce C8 NFLH eight-cylinder horizontal diesel engine rated at 190 b.h.p. at 1,500 r.p.m. and a Stone Tonum ARK 64L XR22S alternator with overhung exciter, rated at 133 kVA, 400 volt for three-phase 50-cycle supply. The engine and alternator are bolted together to form one unit and coupled by means of a Twiflex coupling. The unit is resiliently mounted under the car with the shafts parallel to the direction of travel. The engine is accessible for servicing from both sides of the track. The radiator is mounted on the underframe in such a position that air is drawn in from the side of the car by the Serck hydraulically driven fan. The exhaust gases pass from the manifold through flexible piping to an underframe-mounted silencer and then to the end of the car where they enter a secondary silencer before exhausting at roof level.

The fuel tank is situated on the centre line of the underframe and has a capacity of 100 gallons. Two filler pipes fitted with caps are provided, one on each side of the car. Two mechanical fuel gauges are fitted to the tank and one is visible from each filling position.

The four-pole alternator is of the rotating-field type having salient poles with pole face windings for improved stability of operation. The machine is totally enclosed and is cooled by an external cowled fan, mounted on an extension of the rotor shaft, which blows air over the finned exterior. In addition to the engine-driven alternator set, electrical control equipment in totally enclosed boxes is mounted on the underframe of the auxiliary power car. Protective devices incorporated in the equipment comprise overvoltage relay, overload relay, low-water level switch, low oil-pressure switch, fire-control switches and the usual fuses.

Power Distribution

The power for lighting and air conditioning the train is generated at 400 volts a.c. three-phase 50 cycles and is distributed by two four-wire feeders running the length of the train. The bulk of the lighting, a large proportion of which is fluorescent, is supplied at 230 volt a.c. by phase-to-neutral connection of the 400-volt feeders and the remainder is supplied at 110 volts a.c. from a 230-110-volt lighting transformer.

The compressor, the condenser fan motor and the floor and air heaters are connected to the three-phase 400-volt supply. The air-conditioning fan motor and the control circuits are supplied at 24 volts d.c. from a three-phase transformer-rectifier unit, which also maintains a 24-volt, 216-Ah battery in the charged condition. The emergency lighting supply is obtained from this battery, which is mounted beneath the car.

Air Conditioning

Experience in the technique of air conditioning has established a definite zone of satisfactory temperature and relative humidity conditions. The required conditions can be produced by a refrigerating and heating installation, which must be

accurately controlled and capable of some adjustment to suit detailed requirements of the particular service. Air cooling and dehumidification are accomplished by means of a mechanical refrigeration system employing Freon 12 or Arcton 12 as the refrigerant. The compressor and condenser units of the system are mounted on the underframe. The evaporator unit is mounted above the car ceiling. The cars are electrically heated by elements mounted in the air conditioning unit and at floor level. The temperature within the car is thermostatically controlled. The transition from cooling to heating and vice versa is entirely automatic. Three different temperature settings are available and can be selected by a manual control switch within the car.

The air is circulated by centrifugal fans in the air-conditioning unit. Outside air is introduced through a filter and mixed with a proportion of filtered return air. This mixture is then blown over the cooling coils of an evaporator, delivered into the air duct and distributed to all parts of the car. Part of the air is allowed to escape to the outside atmosphere through static ventilators, but a slight pressure is always maintained within the car. Before entering the air-conditioning unit the air may have a high moisture content. This includes moisture given off by passengers and moisture contained in the outside air. In passing over the cooling coils of the evaporator the air is in intimate contact with a large number of cold metallic surfaces. These are at a temperature below the dew point of the air and a proportion of the moisture in the air therefore condenses. When heating is required the air circulates in the same way. It passes over the cooling coils, which are then inoperative and over a group of heating



relay interlocking control systems

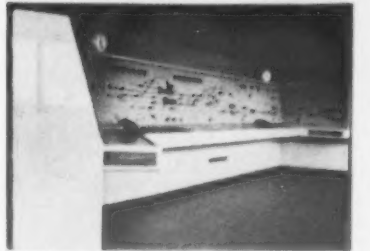


Pioneers in Relay Interlocking Control (first installation at Thirsk on the York-Northallerton line in 1933), S.G.E. remain in the forefront in this form of signalling control which has superseded the mechanical or electro-mechanical systems formerly used. In the comprehensive range of S.G.E. control systems there is a design to meet every requirement, including miniature type panels if specified. Panels can either be fully equipped with keys, signal and point indications or associated with a separate console.

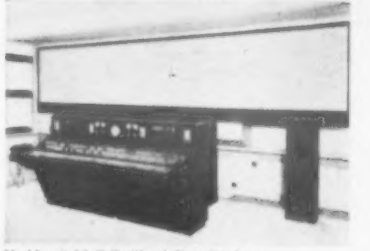
THE SIEMENS AND GENERAL ELECTRIC RAILWAY SIGNAL COMPANY LTD.
EAST LANE, WEMBLEY



Elburg, South African Railways, with provision for extensions



Sittingbourne, B.R. Southern Region



Huddersfield, B.R. North East Region



Rainham, B.R. Southern Region



Rochester, B.R. Southern Region

British Railways' new Diesel Pullman trains*-



-air-conditioned by Stone-Carrier, of course!

*Built by Metropolitan-Cammell Carriage & Wagon Co. Ltd., Birmingham, who also entrusted J. Stone with the auxiliary power equipment and lighting, these trains are the first in Britain to be fully air-conditioned.



J. STONE & CO. (DEPTFORD) LTD., LONDON, S.E.14

ADDITIONAL PRINCIPAL SUB-CONTRACTORS

Fire protection equipment	Graviner Manufacturing Co., Limited
Heater-demisters, driver's compartment	S. Smith and Sons, Limited
Warning horns	C. V. Desiderio, Limited
Windscreens wipers	Trico-Folberth, Limited
Hydro-pneumatic buffers	G. Turton Platts, Limited
Pipe fittings	Reich Ermeto Corporation
Driver's and guard's seats	A. W. Chapman, Limited
Metallic fittings, locks, etc.	J. Beresford and Son; Jones and Foster, Limited; J. Kaye and Sons; and Taylor and Osbourne, Limited

An abridged list of principal sub-contractors appeared last week.

valve and on passing into the evaporator coils, which are at a lower pressure, it evaporates. Its temperature falls and the evaporator coils are thus cooled. The air passing over the evaporator coils is lowered in temperature and its moisture content is reduced. The refrigerant leaving the evaporator is completely vaporised and returns in this state to the compressor, completing the refrigeration cycle.

Control Equipment

The equipment is controlled from a panel situated in a cupboard in the car. The operation of the air-conditioning equipment is entirely automatic and is controlled by Vapor thermostats which operate pilot relays. Closure of the fan and temperature control isolating switch energises the control circuit and starts the circulating fan. When the demand is for heating, the heating contactors are energised. When the demand is for cooling, the motor line contactors are energised to start the condenser-fan motor and the compressor motor through a star-delta sequence.

The temperature-control switch enables one of three operating conditions to be selected. At low, the heating comes on when the temperature falls below 68 deg. F. and the cooling goes off when the temperature falls below 70 deg. F.; at medium, the heating comes on when the temperature falls below 71 deg. F. and the cooling goes off when the temperature falls below 73 deg. F.; and at high, the heating comes on when the temperature falls below 74 deg. F. and the cooling goes off when the temperature falls below 76 deg. F.

To ease the load that would be imposed on the power supply if the air conditioning motor compressors on every car started simultaneously, a time delay is incorporated in the air-conditioning control circuit on each car. This is a thermal relay with a variable resistor in its heater circuit that can be set manually to give any delay from about five seconds to one minute. The dial in each car is set differently so that when the train air-conditioning system is switched on the equipment in each car starts at a different time.

NEWS FROM ALL QUARTERS

Stop-Go Traffic Lights in Brighton

The red-amber phase in traffic lights will be omitted in an experiment throughout Brighton and Hove and Portslade which started on Monday.

Work on Stafford By-pass

Nearly five miles of motorway, with 24 bridges and a three-quarter mile "all-purpose" road, by-passing Stafford, are to be built in the next 23 months. The Minister of Transport has authorised Staffordshire County Council, as his agent, to accept the John Laing and Son tender of £2,680,000 for this and associated works, the second contract in the Stafford by-pass project.

New International Consignment Note

A new form of international consignment note for traffic conveyed by rail-sea services between Great Britain and Europe under the conditions of the International Convention Concerning the Carriage of Goods by Rail, 1952 (C.I.M.), comes into force from July 1. Principal traders and agents in this country have been advised of this and an advice to the public and an explanatory notice are available.

No Right Turns on Part of Euston Road

Right turns are to be banned to traffic along a section of the Euston Road—Marylebone Road route as part of a police experiment to improve traffic flow in the neighbourhood of Great Portland Street Station. This experiment is expected to start towards the end of July. Movements at the junctions with Osnaburgh Street, Albany Street, Park Square East and Park Square West are concerned. No London Transport bus routes are affected. This may be the prelude to an extension to other important intersections, e.g. Oxford Circus.

Four Thousand Unlicensed Vehicles

Since the introduction of the provision in the Finance Act, 1959, making it an offence to keep (as distinct from to use) an unlicensed vehicle on the public road from October 1, the London County Council has received from the police 4,103 reports of unlicensed keeping. Legal proceedings have been authorised in 480 cases; 119 of them have already been dealt with by the courts which have imposed fines of the order of £2 to £5 plus costs. In a further 2,067 cases the licence duty has been received and the remaining cases are in the process of being dealt with.

Blackwall Tunnel Inauguration

The Minister of Transport, at the invitation of the chairman of the L.C.C., inaugurated the construction of the new second bore of Blackwall Tunnel on Monday this week in Blackwall Way, Greenwich. The project will take about 3½ years to complete. The cost is expected at this juncture to be £8,972,000 with associated works. The new northern approach at Poplar, including the underpass to East India Dock Road, was brought into use on June 26. Two-way working has accordingly been restored in East India Dock Road from that date, after a series of diversions in the area extending over 18 months. The new approach road runs into Brunswick Road.

Rail Service Withdrawn

The passenger train service between Risca and Nantybwlch (Mon.) was withdrawn by the Western Region on and from June 13.

Sunday Rail Services Around Birmingham

The London Midland Region has reopened Gravelly Hill and opened Butlers Lane Halt, two suburban Birmingham stations, on Sundays for an experimental period. Birmingham—Four Oaks trains will call at Gravelly Hill and Birmingham—Lichfield City trains at both Butlers Lane Halt and Gravelly Hill.

Vehicle Licences for Any Twelve Months

Under the terms of the Road Vehicles (Period Licensing) Order, 1960, which comes into force on October 1, an excise licence may be taken out for a motor vehicle for any period of 12 months or, in the case of any vehicle for which the annual rate of duty exceeds £3, for any period of four months. This change, foreshadowed in MODERN TRANSPORT, has been made to ease the burden on taxation offices at certain times of the year.

Rules for Bluebell Line

The B.T.C. (Horsted Keynes and Sheffield Park) Light Railway Order, 1960, brings the section of line formerly worked by the Southern Region between those stations, and now leased to the "Bluebell Line," under the terms of the Light Railways Acts. Apart from restrictions upon weight of locomotives and rolling stock which may be used, in relation to rail weights, an overall maximum speed of 25 m.p.h. is imposed and not more than eight trains daily may be worked each way.

Leicester Rail Freight Centre

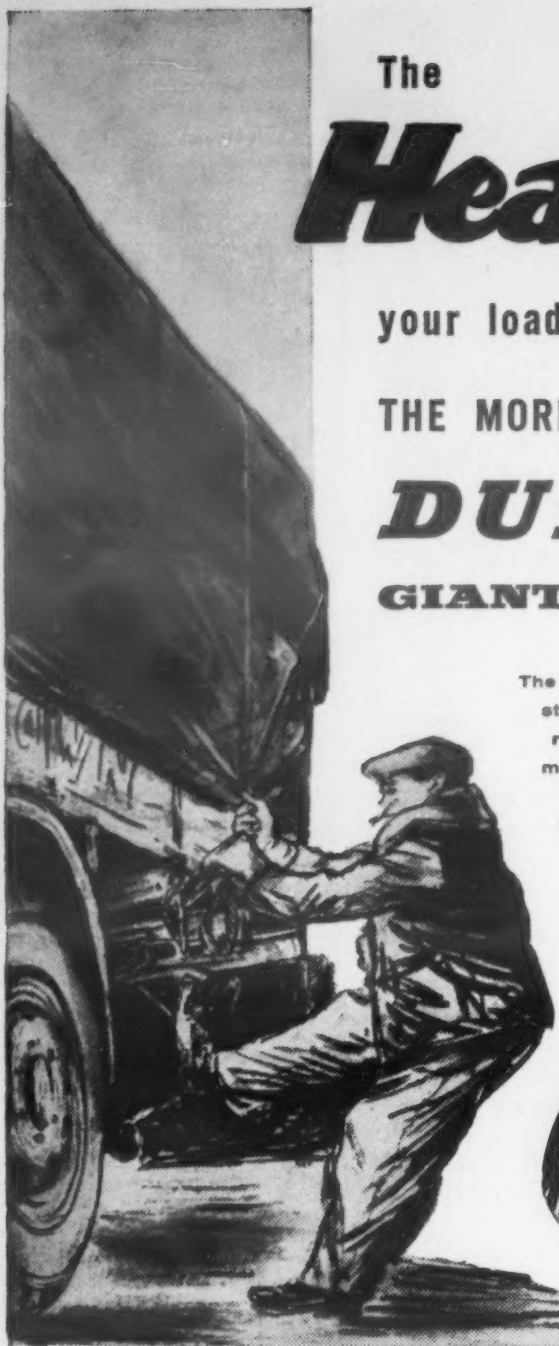
A start has been made on a £465,000 scheme to convert the railway depot at Queen Street, Leicester (L.M.R.) into a freight concentration area for the whole of the Leicester district. The scheme is designed to speed up door-to-door delivery and collection services for local traders and manufacturers. Some of the existing offices and buildings will be renovated and remodelled and 16 new tracks will be laid within the depot to cope with the increased traffic. Operations in the depot will be improved with the aid of conveyors and other handling equipment.

Tribulations of Ceylon Railway

The Ceylon Government Railway is fighting a losing battle against road hauliers. Lorries now operating on unrestricted route licenses are eating into railway revenue, causing a loss to the railway of Rs.2 million a year, it is said. Route restrictions on lorries were removed two years ago, since when they may operate on any route on an open licence. Mr. B. D. Rampala, general manager of the railway, has told the Minister of Transport that if this competition from road hauliers is not removed the loss to the railway will keep mounting by several additional millions of rupees every year. In three years' time, he estimates, the loss will be Rs.10 million. He has suggested that the railway be given a monopoly to transport all bulk imports and exports in order to save the situation.

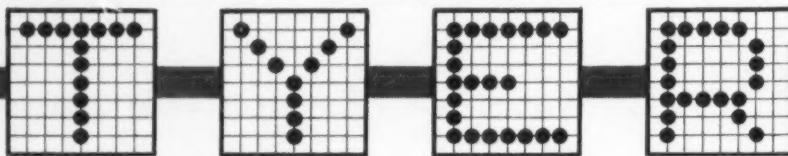
The
Heavier
your loads
THE MORE YOU NEED
DUNLOP
GIANT TYRES

The heavier the load the greater the stress on the tyres. For complete reliability, very long mileage and maximum safety choose from the Dunlop range of Giants. There is a tyre for the heaviest load, a tyre for the roughest roads. In fact, a tyre individually built to suit your needs.



CPH/MS/404

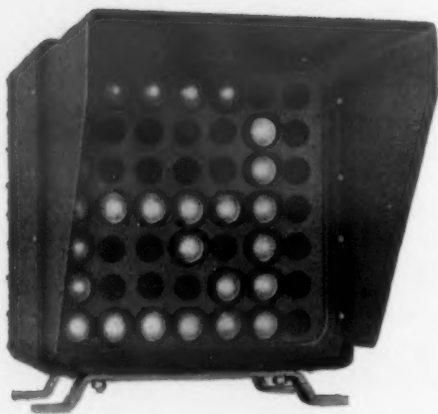
Established 1851

Within the organisation of the
Southern Areas Electric Corporation

MULTI-LAMP ROUTE INDICATOR

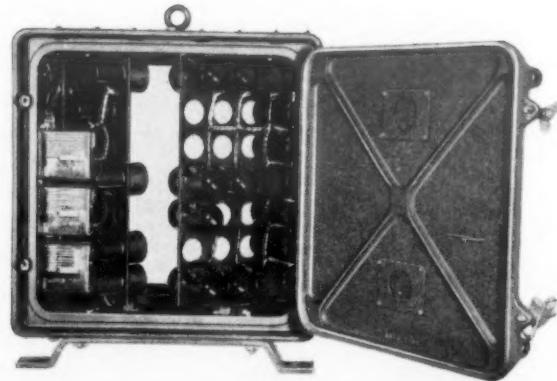
Style F2/16A with 16 inch characters

Embodying all the desirable features to be found in a practical design: excellent indication over long range in sunlight, together with ease of maintenance due to accessibility of all parts.



Finish: matt black unless otherwise specified.
Front Glass: clear, amber or blue.
Hood: pivoted and controlled to allow 6 in. drop away from top to facilitate cleaning.
Fitting: suitable for top of post or light signal, above or below gantry.
Units can be mounted side by side and fitted with a common hood.
Similar unit available for displaying 20 in. characters.

- ★ Robust in construction, aluminium throughout with one-piece door fitted to left- or right-hand side.
- ★ Economical in size—20½ in. x 20½ in. x 14½ in. with 15 in. deep hood.
- ★ Light in weight—80 lb., without fixing brackets.



Suitable for high or low voltage operation. Indicator lamps arranged symmetrically in 7 rows of 7 at 2½ in. centres. Each lamp is contained in its own indicating unit. This consists of lens and bezel; the main plastic body; and the lamp-holder, which can be removed to facilitate lamp changing and inspection. Each lens unit is fitted with a synthetic shroud ensuring clear definition and also eliminating phantom effect. All lamp units are fitted to a two-piece honeycombed panel, so hinged that all lens units and the inner surface of the main glass can be easily cleaned. Terminals for incoming wires are O.B.A. Cable glands for lead-outs are normally provided. Control and proving relay are fitted internally.

TYER & COMPANY LTD

Perram Works, Merrow Siding,
Guildford, Surrey, England

Telephone: Guildford 2211 Grams: Switchmen, Guildford

Manufacturers of:
Railway Signalling and Telegraph, Electronic
and Temperature Control Equipment.



COMMERCIAL AVIATION

British United Airways

DEPUTIES FOR VANGUARDS

FURTHER details were given this week of the organisation of British United Airways, which represents a merger between Airwork and Hunting-Clan. The reorganisation of the new joint company is virtually complete. It will include, as well as these two companies, several of the former Airwork subsidiaries whose old individual names will now cease to exist. Chief among them are Air Charter, Morton Air Services, Olley Air Services, Transair, Airwork Helicopters (previously Fison-Airwork) and Bristow Helicopters. These two helicopter companies will be combined to form the helicopter division of British United Airways. Three companies will retain their present names and individuality although they are wholly owned subsidiaries of British United. They are Airwork Services, Limited, at Hurn, concerned with engineering, design and development, training and aircraft sales; Aviation Traders (Engineering), Limited, an engineering and maintenance organisation at Southend; and the Channel Air Bridge, Limited, which operates the passenger and vehicle-ferry services from Southend to the Continent. British United Airways is backed by the Blue Star Line (20 per cent), the British and Commonwealth Shipping (16 per cent), Furness, Withy (20 per cent), Clan Line (16 per cent), Mr. T. L. E. B. Guinness (10 per cent), the Hunting Group (8 per cent) and Whitehall Securities and others (10 per cent). Its board comprises Mr. M. D. N. Wyatt as chairman, Sir Nicholas Cayzer as deputy chairman, Mr. R. C. Benbow, Mr. A. E. Bristow, Mr. Anthony Cayzer, Mr. R. L. Cumming, Mr. P. B. Guinness, Mr. L. C. Hunting, Mr. F. A. Laker, Mr. T. W. Morton, Mr. G. N. A. Murrant, Lord Poole, Mr. B. R. Seton-Winton, Mr. J. A. Thompson and Mr. G. H. Trott. Mr. T. L. E. B. Guinness, who has been connected with Airwork from its very earliest days, will remain as president of the new company.

Several members of the British United Airways board will assist the chairman as active executive directors: Mr. Cumming, as secretary of the company and in charge of its finances; Mr. Laker in charge of the air transport division (fixed-wing); Mr. Morton in charge of overseas contracts; Mr. Bristow in charge of the helicopter division. Mr. Peter Lewindon has been appointed general manager of the air transport division under Mr. Laker. The company's fixed-wing fleet totals 52 aircraft, including 4 Britannias, 2 DC6As, 11 Viscounts, 4 DC4s, 13 Bristol 170s and various other aircraft. The main operations base will be Gatwick Airport, although aircraft will also fly from Southend, which is the Channel Air Bridge base, Stansted, and Redhill where the helicopters will be concentrated. British United Airways is expected to carry a total of nearly 400,000 passengers during 1960. The helicopter division is currently working on oil exploration and agricultural jobs in this country, the Caribbean, Central and South America, the Middle East and Persian Gulf areas, and West Africa. Its main base in this country is at Redhill Aerodrome but it also operates from the London Heliport.

Swissair's Second DC8 Delivered

On June 20 Swissair's second Douglas DC8 (HB-IDB) *Jungfrau*, was delivered in Zurich. With 109 passengers on board, it covered the distance from New York to Zurich non-stop in 7 hr. 23 min.

More Flights to South Wales

To meet increased demand, British United Airways is to run an extra service weekly from Gatwick to Swansea and Milford Haven. The first extra flight was scheduled for June 30, and every Thursday thereafter throughout the summer. It is operated with Heron aircraft.

Sabena Boeings Through Shannon

Sabena (Belgian Airlines) has announced the commencement of Boeing 707 transatlantic services from Shannon to New York with effect from July 6. These services will operate on Wednesdays and Saturdays during July, August and September, with the addition of a service each Monday from mid-August to mid-September. There is, however, no balancing service.

Proteus Achieves Record Overhaul Life

The Air Registration Board has now authorised the extension of the overhaul life of the Bristol Siddeley Proteus 705 from 2,000 to 2,400 hr. The overhaul life of the Proteus has been extended to 1,300, to 1,600, to 2,000 and now to 2,400 hr. more quickly than that of any aero-engine of any type in the history of aviation. Extremely few engines have ever achieved an overhaul life of 2,400 hr. and no engine comparable in power with the Proteus has ever done so.

Napier-Powered Helicopter Record

The Napier Gazelle-engined Bristol Type 192 (Belvedere) helicopter recently achieved new records, subject to official confirmation; they are London-Rome, 8 hr. 13 min. elapsed time for 850 nautical miles, with an intermediate stop, and 12 hr. 6 min. elapsed time for 1,220 nautical miles from London to Luqa, in Malta. The average speed (flying time) for the London-Malta trip was 113 knots (130 m.p.h.) and the all-up weight leaving Gatwick was 19,860 lb.

V.H.F. London-Paris Service

On July 1 British European Airways is opening its most intensive service ever between London and Paris with no fewer than 30 Viscount flights a day operating between the two capitals. This very-high frequency service is the solution adopted for coping with the extremely heavy mid-summer traffic originally intended to be carried by the new 110-passenger Vickers Vanguard. The schedule planned for the Vanguard, the delivery of which has been delayed due to an engine fault, would have involved seven services a day in each direction between the two capitals. The last-night tourist-flight of the day was to have been continued as a Viscount service. Continuation in service of the smaller turboprop Viscount has made it necessary to double the number of flights planned for the Vanguard. In order to operate the higher frequency service B.E.A. has acquired two extra Viscounts 779s from the Norwegian operator Fred Olsens Flyselskap A/S and has transferred another two B.E.A. Viscounts to the London-Paris route from other operations where they will be replaced by chartered aircraft. Because of the difficulty of converting all aircraft to the same standard first and tourist class cabin layout it has been decided that only one class—tourist—can be offered pending the introduction of the Vanguard later this year.

PRESIDENT OF S.B.A.C.



George H. Dowty

Sir GEORGE H. DOWTY, F.R.Ae.S.

Elected president of the Society of British Aircraft Constructors for 1960-61, Sir George (Herbert) Dowty is chairman and managing director of the Dowty Group, Limited, which, since he founded it in 1931 as Aircraft Components, Limited, has widened its interests substantially until it has become one of the major manufacturers of hydraulic equipment, much of which has transport application. Born on April 27, 1901, and educated at Worcester Royal Grammar School, he began his career with Heenan and Froude, Limited, in 1918, and was subsequently connected with several aircraft manufacturers, including A. V. Roe and Co., Limited, and the Gloster Aircraft Co., Limited. In 1931, as already indicated, he founded Dowty Equipment, Limited, and the part that company played in the 1939-45 war is shown by the fact that it had an annual turnover of some £12 million. In 1939 he established Dowty Equipment (Canada), Limited, and the Dowty Corporation of New York, and in 1952 a further Dowty factory was established in Australia by Dowty Australia Pty., Limited. Since then progress has continued steadily both with the establishment of new subsidiary companies and by the acquisition of others. On December 31, 1958, all the share capital of Rotol, Limited, was acquired from Rolls-Royce, Limited, and the Bristol Aeroplane Co. Limited. Sir George, who received his knighthood in the Birthday Honours of 1956 for his work as chairman of the North Gloucestershire Disablement Committee, has been responsible for the invention of many pieces of aircraft equipment including the remarkable liquid spring and the activities of his organisation now include the design and manufacture of fuel pumps and complete systems for jet engines, quantity production of the firm's hydraulic pit prop, other mining equipment, rubber sealing rings, hydrostatic transmissions, hydraulic agricultural and marine equipment, railway buffers, and airscrews. He was president of the Royal Aeronautical Society for 1952-53 and in 1955 was awarded its Gold Medal for the Advancement of Aeronautical Science. He was made an honorary freeman of the Borough of Cheltenham in 1955, is president of the North Gloucestershire Productivity Association and a governor of the North Gloucestershire Technical College. He is chairman of the Industrial Development Board for Malta. Sir George was chairman in 1954-56, and deputy chairman 1956-58, of the equipment group associate members committee of the Society of British Aircraft Constructors and vice-president of the society 1958-60; he has been a member of its council since 1954.

RAIL PAY AGREEMENT

Based on Guillebaud Report

RETROSPECTION

At a meeting on June 24 between the chairman and representatives of the British Transport Commission and representatives of the three railway trade unions to discuss developments arising from the Guillebaud Committee's report, agreement was reached that the revised rates of pay arising from the report would apply from January 4, 1960, which is the commencement of the first full pay period following December 31, 1959, the date taken for the basis of comparison. In a subsequent statement it was said to be the common desire of the Commission and of the trade unions to convince the nation of their determination to promote the highest efficiency on British Railways. An early meeting of the British Railways Productivity Council would be held to discuss further steps which could be taken with this object in view.

As suggested by the Guillebaud Committee of Inquiry into Railway Pay, a simplified pay structure for wages staff has also been evolved and has resulted in some 40 different rates of pay, covering 150 grades, being reduced to 14 pay groups with rates ranging from 168s. to 260s. a week. At the same time, the number of titles of grades has been substantially reduced. The 14 pay groups are as follows:

Group	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	168	173	177	183	187	194	198	205	210	220	230	234	248	260

Some examples of the proposed new rates for various categories of staff are given below, together with a comparison with the rates in force before and after the interim pay increase of January 11, 1960.

	Before Jan. 11 1960	After Jan. 11 1960	From operative date
CONCILIATION STAFF			
Porter (Gp. 1)	151s. 6d.-156s. 168s.	159s.-164s.	168s.
Leading porter (Gp. 3)	162s.	170s.	177s.
Ticket collector (Gp. 5)	172s. 6d.	181s.	187s.
Train ticket collector (Gp. 7)	179s. 6d.	188s. 6d.	198s.
Guard, 1st year (Gp. 8)	166s. 6d.	175s.	187s.
Guard, 3rd year (Gp. 9)	185s.	194s. 6d.	210s.
Signalman, Cl. 4 (Gp. 7)	173s. 6d.	182s.	198s.
Signalman Spl. "B" (Gp. 14)	216s. 6d.	227s. 6d.	260s.
Signalman Spl. "C" (Gp. 14)	223s. 6d.	234s. 6d.	260s.
Shunter (Gp. 6)	171s. 6d.	180s.	194s.
Head shunter (Gp. 9)	185s.	194s. 6d.	210s.
Yard foreman (Gp. 11)	201s. 6d.	211s. 6d.	230s.

	Before Jan. 11 1960	After Jan. 11 1960	From operative date
Permanent Way			
Permanent way man (line labourer) (Gp. 1)	151s. 6d.-156s. 168s.	159s.-164s.	168s.
Lengthman and relayer, 1st year (Gp. 2)	152s. 6d.	160s.	173s.
Lengthman and relayer, 3rd year (Gp. 4)	160s. 6d.	168s. 6d.	183s.
Sub-ganger (Gp. 6)	168s.	176s. 6d.	194s.
Relaying ganger (Gp. 10)	192s.	201s. 6d.	220s.
Machine operator, Group 1 (Gp. 5)	165s. 6d.	174s.	187s.
Machine operator, Group 4 (Gp. 9)	186s. 6d.	196s.	210s.

	Before Jan. 11 1960	After Jan. 11 1960	From operative date
FOOTPLATE			
Engine cleaners (until prescribed number of firing turns has been worked)	154s.-156s.	161s. 6d.-164s.	168s.
(after prescribed number of firing turns has been worked)	168s.	170s. 6d.	183s.
Firemen and assistant motormen—1st year	168s.	176s. 6d.	183s.
2nd year	179s. 6d.	187s. 6d.	194s.
3rd year	190s.	199s. 6d.	205s.
(after prescribed number of driving turns have been worked)	204s.	214s.	220s.
Drivers and motormen	204s.	214s.	220s.
Shunting—1st year	216s. 6d.	227s. 6d.	234s.
2nd year	229s.	240s. 6d.	248s.
3rd year	244s.	254s.	260s.
Train driving	216s. 6d.	227s. 6d.	234s.
1st year	229s.	240s. 6d.	248s.
2nd year	244s.	254s.	260s.
3rd year	259s.	270s. 6d.	278s.

(1) In addition to their rates of pay shown above, footplate staff receive a mileage allowance for distances of 65 miles and over. The existing mileage allowance is payable for 70 miles or over.

(2) London allowance in all above grades to be raised from 3s. to 6s. per week for staff aged 20 and over.

	Before Jan. 11 1960	After Jan. 11 1960	From operative date
SALARIED			
Male clerical staff			
Junior	per annum 192-209	per annum 202-219	per annum 220-255
Adult—Cl. 4	318-321	334-347	*200-600
Cl. 1	707-753	742-791	790-835
Cl. Spl. "A"	798-857	838-900	885-945
Cl. Spl. "B"	914-985	960-1,034	1,010-1,065

* As the proposed new standard rate in this case involves a reduction in the existing rate of pay operative from January 11, 1960, present staff will receive £334 on a personal basis.

	Before Jan. 11 1960	After Jan. 11 1960	From operative date
Stationmasters, goods agents, yard masters, shed masters, etc.			
Class 4	per annum 583	per annum 600	per annum 620
Class 1	717-763	753-801	800-860
Class Spl. "A"	798-857	838-900	*A(1) 920-960
Class Spl. "B"	914-985	960-1,034	*B(1) 1,055-1,140

* Scales A(2) and B(2) apply to stationmasters, relief stationmasters, goods agents, passenger and parcel agents, and scales A(1) and B(1) to yard masters, shed masters, assistant stationmasters, assistant goods agents and assistant yard masters.

	Before Jan. 11 1960	After Jan. 11 1960	From operative date
Male supervisory staff			
Class 4	per annum 533	per annum 560	per annum 610
Class 1	717-763	753-801	800-860
Class Spl. "A"	798-857	838-900	885-945
Class Spl. "B"	914-985	960-1,034	1,010-1,065

† This rate is designed to overcome narrowing of the differentials in the case of supervisors in charge of staff who, under the Guillebaud Report, get more than the standard increase.

	Before Jan. 11 1960	After Jan. 11 1960	From operative date
Traffic control staff			
Class 2	per annum 625-660	per annum 650-685	per annum 720-760
Class Spl. "A"	798-857	838-900	920-960
Class Spl. "B"	914-985	960-1,034	1,055-1,140

London allowance in salaried grades to be raised from £10 to £20 per annum for all staff aged 20 and over.

At a meeting of the London Transport Railway Negotiating Committee on June 29, the effect of the revised British Railways pay rates was discussed and it was agreed to set up a working party to report on the matter as quickly as possible.

Cheney...

THE CLIP WITH A NEVER-RELAXING GRIP

It's the exclusive Cheney design and patented thrust washer and insert that give the Cheney Clip that extra, never-relaxing grip. A larger diameter screw ensures deeper, more positive thread engagement to withstand 25% extra torque — and yet the Cheney Clip costs no more than any other type. Always fit a Cheney Clip and see the difference.



Trade Enquiries to: FENTER LTD., 184 ASTON ROAD, BIRMINGHAM 6

A Subscription to
MODERN TRANSPORT
will keep you in touch
with all British and Foreign
transport developments

NEW AIR-RIDING VEHICLE

Britten-Norman Cushioncraft Demonstrated

DEMONSTRATION last week at Bembridge, Isle of Wight, of a new type of air-riding vehicle developed by Britten-Norman, Limited, formed a prelude to full-scale testing on the Bembridge airfield and, later this year, under intended operating conditions in West Africa. Britten-Norman, Limited, with its associated companies is a very large operator of agricultural aircraft and has studied the potential of an air-riding vehicle in many overseas countries. Investigation is said to have shown possibilities with such craft of accelerating the pace of development in areas without roads and where rivers become seasonally unnavigable.

The present prototype vehicle, named Cushioncraft, has been built at the request of Elders and Fyffes, Limited, which company intends to study its potential in banana transport from plantations in the Southern Cameroons. The company hopes to be able to avoid the high cost of building roads and also the long lorry runs over indifferent runs otherwise necessary, which cause bruising or scarring of the fruit. Rights of way are being sought to bulldoze tracks from plantations to the river, thus making possible carriage without intermediate handling clear from plantations to banana ships at the down-river wharf.

General Description

The Cushioncraft is circular, 18 ft. 10 in. in diameter and 8 ft. high; it has an empty weight of approximately one ton. It carries a driver and two passengers in a cab mounted on the deck, where there is also space for outside cargo. The craft is designed to operate about 12 to 15 inches above water or ground. The power unit is a Coventry Climax two-litre petrol engine giving up to 170 b.h.p., which drives a large compressor running round the circumference of the vehicle and two rear-mounted propellers. The peripheral compressor, which is the most important feature of the design and reduces losses by keeping the

length of ducting to a minimum, supplies air to a single-jet nozzle around the bottom edge of the craft to maintain the air cushion.

The compressor is driven mechanically by a friction wheel at the rear of the craft and consists of 40 aerofoil blades fixed radially to an inner and outer shroud ring, the whole being kept in place by a series of rollers. The compressor is mounted in a short vertical duct. Below the rotor this duct curves inwards so that the air is directed towards the centre of the craft. The duct is 10 in. wide at the efflux and the resulting "thick" jet helps to stabilise the craft when riding on the air cushion. The two propellers mounted above the deck at the rear, which provide horizontal propulsion, are of variable pitch and pitch can be varied collectively to provide ahead or astern propulsion or differentially for steering.

Controls comprise a combined hand throttle and clutch to engage the compressor and control ground clearance and a steering wheel, which can be pulled backwards and forwards from the control panel to provide ahead or astern travel or turned to steer left or right. Six small pneumatic-tyred wheels are fitted beneath the Cushioncraft to enable it to be pushed about on the ground when the engine is not running. These wheels can be jacked up and down to provide sufficient ground clearance for servicing.

Work Potential and Cost

Design studies have shown that reasonably powered Cushioncraft in the smaller sizes could be expected to lift approximately their own empty weight to clearance heights of about one foot and up to twice their empty weight to smaller clearance heights, which would still permit them to run over semi-prepared ground and over water. These studies also showed that there is a lower practical limit to size, since when the cushion area of the machine is very small the power required to maintain the air cushion increases considerably.

After consideration of these factors it was decided that a Cushioncraft of empty weight about one ton and cushion area of approximately 200 sq. ft. represented the minimum practical size which could be expected to satisfy commercial requirements. The cost per pound of basic weight of such a machine in production is not expected to exceed that of simple light aircraft (about £2 per lb. of empty weight) and could in large production be similar to that of motor transport vehicles (about 10s. to £1 per lb.).

Working Principles

The simplest form of air-riding vehicle comprises a plenum chamber or box, open underneath, into which air is pumped by a compressor or fan. Pressure rises in the box until it is lifted off the ground, permitting the air to leak out around the lower periphery. Plenum-chamber machines are not efficient except at very low clearance heights, when the area between the lower periphery of the machine and the ground through which air may leak is small. Plenum-chamber machines are thus only practical over very smooth ground where low clearance heights are acceptable.

The Hovercraft principle is a refinement of the basic system, in which air is ejected inwards from the undersurface of the craft through a nozzle extending around the whole of its perimeter. A region of high-pressure air is thus generated beneath the craft, which in turn deflects the curtain air outwards. When the cushion is established the air curtain is of circular profile touching the surface of ground or water before going to waste in the atmosphere.

Apart from being a source of air to replenish the cushion as required, the air curtain is a seal that provides a pressure step between the cushion and the atmosphere. The basic components of a Cushioncraft are therefore an air intake, a compressor driven by an engine, a nozzle arrangement which in simple form is a single nozzle extending around the periphery of the craft and an area of structure within the air curtain which takes the uniform cushion load.

RAILWAY ELECTRIFICATION

U.K.R.A.S. to Advise Pakistan

THE departure for Karachi by B.O.A.C. Comet from London on July 1 of a team of railway engineers assembled by the United Kingdom Railway Advisory Service and led by Mr. D. Fenton, movements superintendent (Great Eastern Line), Eastern Region, B.R., provides another example of the growing appreciation of the facilities provided by U.K.R.A.S. The purpose is to survey, at the invitation of the Railway Board of Pakistan, various sections of the railways with a view to their electrification. The team will undertake field surveys after first having four or five days' preliminary discussions in Karachi with the Railway Board.

The first section covered will be that from Chittagong to Dacca (approximately 208 miles) in East Pakistan. This completed, the party will return to West Pakistan and visit Lahore, Rawalpindi, and Quetta before going back to Karachi. Sections of the North Western Railway which will be surveyed are those from Lahore to Khanewal (178 miles) and to Rawalpindi (200 miles), Sibbi—Quetta (50 miles) and Karachi—Kotri (100 miles). No time limit has been set for the completion of the work but it is expected to take the greater part of this month. Indeed when it is realised that all the necessary information for the preparation of the report and the provision of full specifications to cover the equipment that would be required must be assembled, it will be seen that the team plans to work itself hard. The railway administrations are providing air-conditioned coaches to house it on the sites—a very helpful move in the climatic conditions normal during this month.

Mr. Fenton, who, save for wartime service with the Royal Artillery, has been with the L.N.E.R. and Eastern Region since 1935, gaining experience in traffic and operating appointments in all parts of the system, will have strong support. He takes with him Messrs. A. B. Henwood, civil engineer, K. Berry, traction projects engineer, T. H. Rosbotham, overhead equipment engineer, F. G. Hathaway, railway signals engineer (he is, incidentally, president-elect of the Institution of Railway Signal Engineers), D. W. R. Cobbe, G.P.O. engineer, and K. M. Jones, power systems engineer. The last-named will follow the party out next week.

CREWE BUS STATION

(Continued from page 3)

with low-pitched asbestos roof, while the office block has a reinforced concrete roof supported on slim steel columns, a form of construction which has permitted prefabrication of windows and partitions. Pastel colours have been used generally for interior decoration. All the buildings are centrally heated by an oil-fired installation, the offices having thermostatically controlled convector heaters.

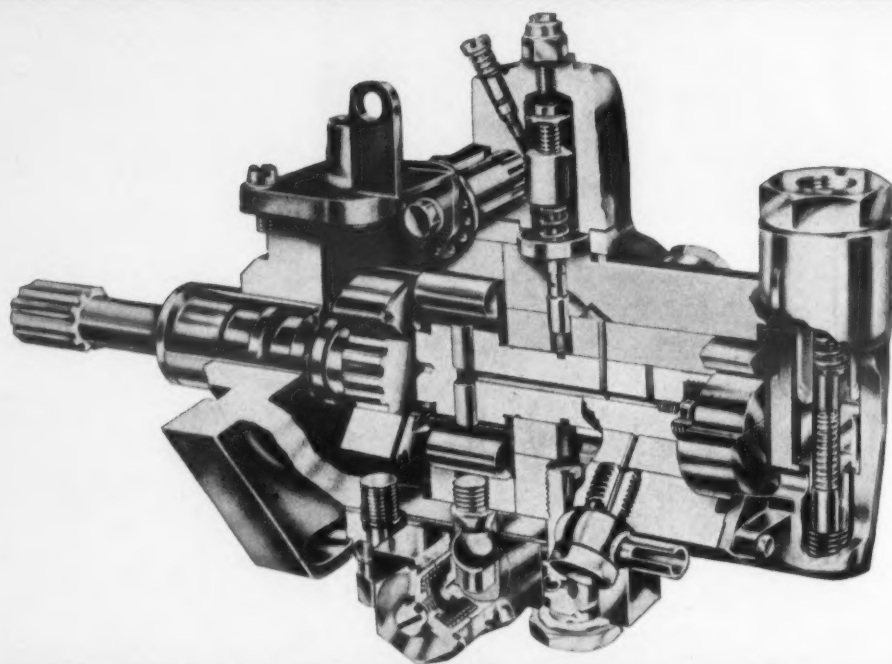
This is one of several large bus stations to be constructed by the Tilling Group of recent years, others comprising those at Bath, Bristol, Tredgar, Lincoln, and the extended premises at Bournemouth. Although stations are costly, they avoid difficulties with street standing and loading and in several of these Tilling group stations the owning company will be able to make economies through saving the operation of empty journeys between the garage and the terminal stances. This, in fact, applies to the situation in Crewe. The design of this remarkably fine garage and bus station is the responsibility of the Tilling group architect Mr. Alan A. Briggs, F.R.I.B.A., the architect-in-charge was Mr. H. Parrish, A.R.I.B.A., and the assistant architect Mr. P. Tvrkovic. The clerk of works was Mr. G. Bishop and the general contractor was Gilbert Ash, Limited.

PUBLICATIONS RECEIVED

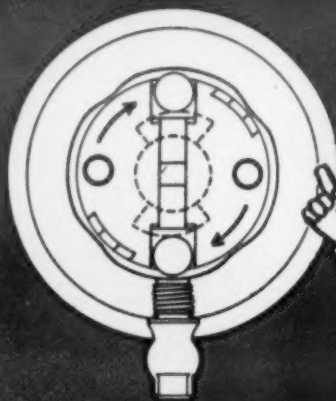
RAPIER 1520 MOBILE CRANE. A new publication by Ransomes and Rapier, Limited, Watford, Herts., describing and illustrating the new 1520 mobile crane for loads up to 15 tons, with boom lengths up to 80 ft.

MOTOR BUSINESS. No. 22, published by the Economist Intelligence Unit, Limited, 22 Ryder Street, London, S.W.1, includes reviews of the British motor vehicle components industry, the French motor industry and the market for British passenger vehicles.

TECHNICAL PROGRESS NEWS is the title of a new technical bulletin on its thermal insulation materials, Caposite and Rocksil, to be published periodically by the Cape Asbestos Co., Limited, 114 and 116 Park Street, London, W.1. Intended for free distribution to Cape's customers in the thermal insulation field, the first issue, recently published, carries an article by Mr. James Warren, manager of the company's insulation contracts division, on some of the problems met with on the contract for the insulation of Berkeley nuclear power station.



The Distributor-type Fuel Injection Pump



ONE PUMPING ELEMENT ONLY

The DPA pump is basically simple in design, and has one pumping element only. This delivers fuel to each cylinder in turn, through the distributor. Accuracy of delivery is 'built-in' by high precision machining. No phasing or calibration is required. There are no highly stressed springs—the opposed plungers are returned by oil pressure. The complete unit operates in filtered fuel oil, and wear is negligible. The DPA is ideally suited for high speed diesels—already over a third of a million are in use throughout the world.



The World's Largest Manufacturers of

FUEL INJECTION EQUIPMENT

C.A.V. LIMITED, ACTON, LONDON, W.3.

ALUMINIUM IN RAILWAY ROLLING STOCK

Exhibition at Strasbourg

THE recent exhibition at Strasbourg of some 45 railway vehicles incorporating aluminium in their construction was organised by the Centre International de Développement de l'Aluminium (C.I.D.A.) in collaboration with the railway administrations of the countries concerned, with the object of illustrating the established uses of aluminium, and its prospects, in this field.

Those attending the opening ceremony from Great Britain included Mr. D. C. Brown, president, the Institution of Locomotive Engineers (Chief Mechanical Engineer of the Crown Agents); Mr. G. T. Hart, secretary, Institution of Locomotive Engineers; Mr. J. F. Pepper, representing the British Transport Commission; and Mr. A. E. Bates, representing the chief mechanical engineer, London Midland Region. Also present were Mr. W. Brining, president, the Aluminium Development Association; Sir Geoffrey Bourne, director-general, A.D.A.; Dr. E. G. West, technical director, A.D.A.; and Mr. F. L. Stafford, assistant technical director, A.D.A. The last named, who is chairman of the Transport Commission of C.I.D.A., was also chairman of the organising body for this exhibition and conference.

The exhibition included vehicles which have given long service, new prototypes and examples of components. The contributions by countries represented were as follows:

Austria: Railcar trailer.
Belgium: A two-car train set and a passenger coach.
France: A main-line coach, two suburban coaches, an articulated coach, an early railcar, a railcar trailer, an open coal wagon, a wagon with automatic discharge gear, a cement wagon, two alumina wagons, a salt wagon, a tank wagon, a sulphur wagon, a wagon with side openings, a wagon with sliding roof and a wagon with trailer.
Germany: A T.E.E.-train restaurant car, two suburban coaches, two railcars, a freight wagon, a wagon with sliding side doors, a wagon with sliding roof, a platform wagon, an alumina wagon and a refrigerator car.
Italy: A couchette passenger coach, a coal wagon and a tank wagon.
Switzerland: A carriage for narrow-gauge mountain railways, a carriage with pneumatic tyres, a standard first-class coach, a covered wagon, a wagon with opening roof, a platform truck, a wagon for transporting cars and a silo wagon.
United Kingdom: A London Transport Underground car, a British Railways two-car diesel train set, a coal hopper wagon, a mineral wagon and a general-purpose container.

The wide variety of components included axle-boxes, bogie parts, brake equipment parts, pantographs, windows and doors. Semi-fabricated aluminium products on view included special extrusions, large rolled plates, sheets for decorative and other purposes and decorative sections. Associated with this exhibition was a number of informal technical discussions on carriages, wagons and general technical topics.

Opening Ceremony

The exhibition was opened on June 20 by Professor Dr. H. Oeftering, president of the Deutschen Bundesbahn and of the International Union of Railways, who was welcomed by Monsieur André Dumas, president of C.I.D.A. Monsieur Dumas, after referring to the importance of the exhibition and its significance in connection with railway construction, expressed gratitude to the Société Nationale des Chemins de Fer Français for providing the site and other facilities that made the exhibition possible. Dr. Oeftering referred briefly to the progress of aluminium in its application to railways and to the evidence of European co-operation in this exhibition, and then performed the opening ceremony by cutting with a pair of anodised aluminium scissors a strip of aluminium tape.

At the inaugural luncheon following the official tour, Monsieur Dumas welcomed guests on behalf of the European aluminium industry and remarked that for road vehicles the same tendency which led to a progressive and inevitable reduction of dead-weight achieved it more and more by the use of aluminium alloys, whatever the type of vehicle, while for marine transport there was hardly a ship which had not made use of them to reduce top hamper, with resultant reduction in the engine power and greater stability.

Passenger Coaches

Railway rolling stock could not escape this development which was characteristic of our time. The first coaches panelled in aluminium appeared on the Liverpool—Southport line in 1905. At that time, however, the advantages of aluminium had not been fully realised. Sizeable construction was not to develop until after the 1914-18 war, and then on suburban lines where frequent stops necessitating frequent changes in working conditions made

weight reduction extremely valuable. Whilst the use of aluminium in coaches rapidly grew in amount and variety, it still seemed inconceivable that the metal should be used for the construction of wagons—probably on account of its first cost. Among the achievements of the period, three were outstanding. In Germany there was the 1927 railcar on the Halberstadt—Blankenburg line with its body structure; in France there were in 1930 the double-deck carriages of the Chemins de Fer de l'Etat where the body structure was a mixed construction of special steel and duralumin; and again in France, the articulated train of the Chemin de Fer du Nord, of aluminium-magnesium alloy and arc-welded construction in 1933.

These coaches, like the Liverpool—Southport stock, were still in service, without failure after 25 years, and had travelled hundreds of thousands of miles. They represented three characteristic types of construction; three stages which proved the value of the techniques as well as the materials; and three methods of construction with a record of low weight per passenger carried which had not been surpassed in metal rolling-stock construction.

Freight Wagons

In freight wagons competition from road transport opened people's eyes, especially after the 1939-45 war, to the part which aluminium could play in their construction. Two characteristics in particular had been exploited. One was resistance to corrosion or to attack from certain products and the improvement in the ratio of load to tare for transport by complete trains. Aluminium eliminated the use of expensive materials for the fabrication of tanks for nitric acid, hydrogen peroxide and beer. It also reduced the maintenance costs for the transport of coal. The economics were sound, despite the first cost of aluminium, when the saving in weight could be transformed to payload, when the annual mileage was high, or when the characteristics of the line limited the size of the train. Complete trains of all-aluminium wagons had been made up for the regular transport of alumina, bauxite, coal, sulphur, phosphates, salt and so on. To be able to benefit from the high ratio of load to tare which was characteristic of these wagons it had been necessary to obtain from the railway companies an extension, albeit still insufficient, of the tariff regulations.

Six tons of aluminium were sufficient for the body structure of a 65-ton payload hopper wagon, thanks to progress in the metallurgy of aluminium and in the technique of using it. Alloys suitable for the requirements of railway structures were principally amongst the non-heat-treatable ones, which attain their mechanical properties by cold working, give good resistance to corrosion and are easy to fabricate and weld. They could be supplied in sheets and sections of large dimensions as was apparent in many of the exhibits. The extrusion process provided the designer with complex cross-sectional shapes which enabled him to realise his designs with the maximum simplicity and speed of fabrication. It was thus possible nowadays to construct a carriage door in a single extruded section.

New Techniques

Welding technique has made very great progress, and both spot welding and inert-gas shielded-arc welding are now done more quickly on aluminium than on steel. Adhesive bonding, very widely used in aviation, could also be applied to railway construction. Many other improvements have now come within reach: the progress which has made possible the flight of the Caravelle today fore-shadows that of the railway construction of tomorrow.

The uses of aluminium today were so varied that its applications in railways was not limited to the actual structure of the rolling stock. It could be used to advantage for fittings in the form of panels or decorative components, polished and anodised. It was a good conductor of electricity and was used for busbars or cables in electric locomotives, and for conductor rails and overhead lines. A good conductor of heat, it was used for the construction of heat exchangers which thus became lighter and less cumbersome than those in ferrous metals. Its high reflectivity—particularly that of the very pure metal—was used for the construction of untarnishable reflectors for lighting and signalling. In the form of foil, it provided a very lightweight thermal-insulating material which did not deteriorate. Dr. Oeftering thanked the C.I.D.A. organisation on behalf of all the railway authorities of the International Union of Railways.

£11m. Locomotive Equipment Orders

170 SETS OF ENGINES AND TRANSMISSIONS

ORDERS for another 170 sets of diesel engines and transmissions for main-line diesel locomotives, which are being erected in British Railways workshops at Crewe, Darlington, Derby and Swindon, have been placed by the British Transport Commission. The Western Region will have 79 of the locomotives, the North Eastern Region will have 53 and 38 are for the Eastern Region. The equipment orders are valued at about £11 million.

Of the 170 sets, 79 comprise twin diesel engines and hydraulic transmissions incorporating torque converters and gearboxes. These are for locomotives which are being built for the Western Region at Crewe, which is erecting 39 of the locomotives, and at Swindon where 40 are being built. The 39 Crewe-built locomotives and 35 of those from Swindon will each have twin diesel engines with a combined horsepower of 2,700. The other five Swindon locomotives, which were ordered earlier, will also have twin diesel engines, but with a combined rating of 2,200 h.p. The 79 main-line locomotives were ordered for a further stage of the Western Region programme for the complete replacement of steam by diesel power on rail services in the Bristol area and in the West of England (west of Newton Abbot), including all the principal passenger and freight services to and from London.

The other 91 sets of equipment are for main-line

diesel locomotives being built for the Eastern and North Eastern Regions in railway workshops at Darlington, Crewe and Derby. Darlington locomotive works is building 25, which will have diesel engines of 1,250 h.p. with electric transmission and are for passenger and freight duties in the North Eastern Region. The 66 remaining locomotives will also have electric transmission but with engines of 2,500 h.p. and will be mainly for passenger train services. Derby works is building 38 of these locomotives for the Eastern Region and Crewe 28 for the North Eastern Region.

Details of the orders are as follows:

J. Stone and Co. (Deptford), Limited, London, S.E.14, for 10 Mekydro hydraulic transmissions for five Type 4 2,200-h.p. locomotives and 74 Stone-Maybach final-drive and cardan shaft sets for 74 Type 4 2,700-h.p. locomotives.
Bristol Siddeley Engines, Limited, Coventry, for 10 Maybach MD650 1,100-h.p. diesel engines for five Type 4 2,200-h.p. locomotives and 148 Maybach MD655 1,350-h.p. diesel engines for 74 Type 4 2,700-h.p. locomotives.
Brush Electrical Engineering Co., Limited, Loughborough, for 74 sets control equipment, 148 dynostarters and 148 automatic voltage regulators for 74 Type 4 2,700-h.p. locomotives.
North British Locomotive Co., Limited, Glasgow, for 74 sets Voith-North British L306rV hydraulic transmission and control equipment for 74 Type 4 2,700-h.p. locomotives.
Brush Electrical Engineering Co., Limited, Loughborough, for 66 power equipments incorporating Sulzer 12LDA28 2,500-h.p. diesel engines and electric transmissions for 66 Type 4 2,500-h.p. locomotives.
Associated Electrical Industries, Limited, Traction Division, Rugby, for 25 power equipments incorporating Sulzer 6LDA 1,250-h.p. diesel engines and electric transmissions for 25 Type 2 1,250-h.p. locomotives.

BRUSH

again!

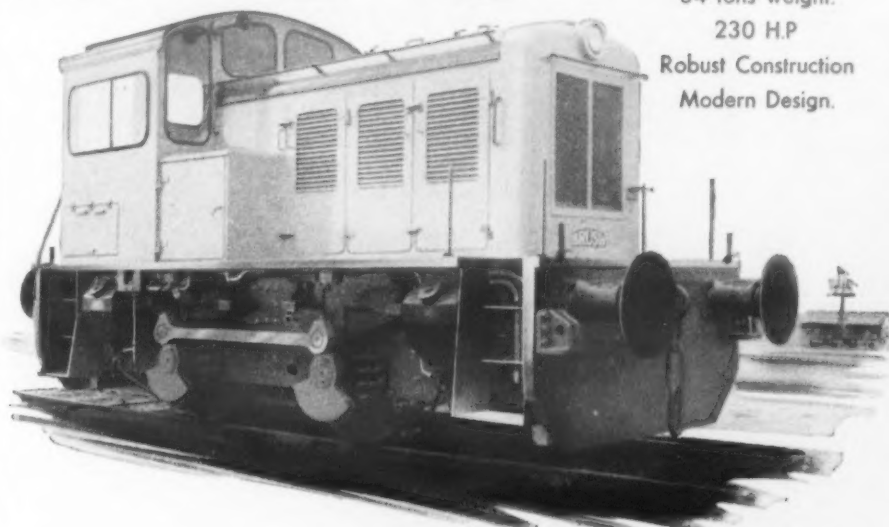
The **Park Gate Iron & Steel Co. Ltd.**

has selected Brush shunting locomotives for its new fleet. Twelve will be supplied to an arranged delivery schedule

0.4.0 SHUNTER

34 tons weight.
230 H.P.

Robust Construction
Modern Design.



BRUSH

TRACTION DIVISION

BRUSH ELECTRICAL ENGINEERING CO. LTD. LOUGHBOROUGH, ENGLAND (Member of the Humber Siddley Group)



tyres
axles
solid wheels
disc centres
assembled pairs
of wheels and axles

for all classes
of railway rolling stock
tramway tyres and axles
gear wheel forgings
and rolled steel rings

JOHN BAKER & BESSEMER LTD

KILNHURST STEELWORKS GPO BOX No. 3 ROTHERHAM YORKS

TELEPHONE: MEXBORO 2154/5/6/7 and 3793 TELEGRAMS: TYRES MEXBORO

London Office: LOCOMOTIVE HOUSE BUCKINGHAM GATE LONDON S.W.1. VICtoria 5278-9

HEAVY-DUTY SIDE FORK CARRIER

Will Transfer 10-Ton Containers

THERE was a demonstration recently at the Lackenby universal beam mill of Dorman Long (Steel), Limited, of the 30,000 lb. capacity Traveloader side-operating fork-lift transporter, manufactured by the Otis Elevator Company (Baker Industrial Trucks Division) and for which the sole U.K. concessionaire is Materials Handling Equipment (Great Britain), Limited, of 40A Dover Street, London, W.1.

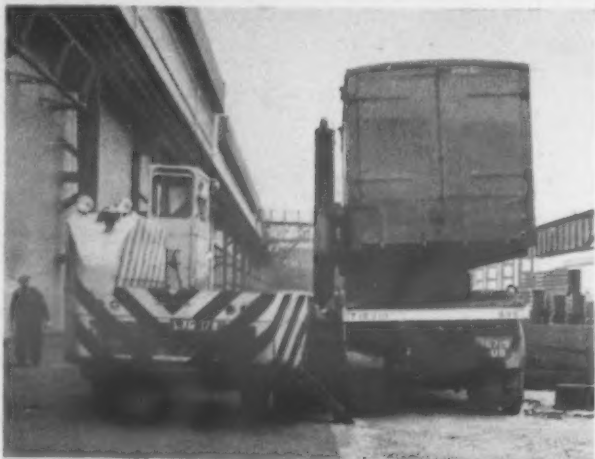
At the Lackenby works near Middlesbrough these carriers are handling parcels of steel beams up to 15 tons in weight where previously overhead gantry cranes were employed. However, the demand for steel beams is such that a new method of handling had to be found which would enable stocks to be moved outside the area served by the cranes. The Traveloader will stack them up to 12 ft., or load them into rail or road vehicle and can work in an aisle only slightly in excess of its own width of 9 ft. To ensure stability of the machine during loading, unloading and stacking, four hydraulic stabiliser arms extend from the vehicle on the loading side, one on each side of both wheels.

To permit the loading or otherwise of high-sided vehicles the Traveloader can be equipped with twin crane arms at the head of the mast (the truck

in the illustration is not so fitted) from which a crane hook is suspended. The driver's cab is fitted with dual controls and seats for operation in either direction of travel.

Dorman Long is so satisfied with the performance of the initial trucks that it intends to extend their application to its new billet and rod mills. There the next Traveloaders will be required to handle parcels of blooms and slabs from the hot banks at temperatures reaching 700 deg. C. and for that purpose they will be specially modified and insulated and a refrigerated cab will be featured.

The Traveloader was also demonstrated transferring a 24 ft. long 10-ton capacity van container of British Road Services from the ground on to a platform vehicle, using the forks. The important feature of the carrier in this respect is, of course, that the container can be safely transported any distance, at a speed of 20-25 m.p.h. on the deck, and it can be stacked on a shelf or platform up to 12 ft. from the ground. A Cummins 125 b.h.p. six-cylinder diesel engine provides the power and operates via an Allison torque converter with three speeds forward and reverse. Service for the Cummins engine is available in this country. Power steering is standard on the Traveloader.



Traveloader side-operating fork carrier loading a 24 ft. long 10-ton container on a road vehicle

CASH-AND-CARRY

Wholesaler Sheds Transport Burden

WITH the coming of the cash-and-carry wholesale grocery warehouse, distribution is refined to the stage where it exists only between manufacturer and wholesaler. The latter has contracted out of his transport burden because his trader customers come to his premises—a whole-

sale super-market—choose their goods, pay spot-cash for them and take them away in their own delivery van, utility or even private car. In MODERN TRANSPORT in April last year the working of a wholesaler-retailer alliance in the grocery trade was described. Cash-and-carry seems an inevitable development, naturally unpopular with the alliances, if the small grocer is to outwit the cut-price super-market and self-service store. The enormous attraction is, of course, that he gets his supplies at well below normal wholesale delivered price and at the cost to himself of only a gallon or so of petrol.

Cautionary Tale

This then is a no-transport story in the professional sense. It is a move which will be watched closely and with no little apprehension by manufacturers and wholesalers who employ substantial road fleets for distribution to retail outlets. The rewards are great; C. and C. Wholesale Grocers, the

Weston company which is the largest in this field, aims to work on a 3 per cent gross profit margin, compared with the normal 10 per cent wholesaler's margin. It can do this, for example, by selling sugar by the package at the 250-ton rate and canned goods at the 200-case rate, because it has no

invoicing costs, no representatives, low warehousing costs and no transport costs. In these circumstances the early demise of retail price maintenance seems inevitable in all sectors.

The Weston group, despite the fact that it runs its own supermarkets, deadly rival of the small trader, already operates four C. and C. warehouses, at Edinburgh, Reading, Eastcote (near Pinner) and Bournemouth and plans many more, commencing with Barking and Woolwich. Eastcote, opened two months ago, draws its regular clientele from places as far removed as Gerrards Cross, Watford and Willesden.

The diagram shows the interior layout of a typical supply house, as Weston calls them. The floor area is about 20,000 sq. ft.; included is 3,000 cu. ft. of cooled or refrigerated space (25 or 42 deg. F.); Klee Klamp tubular racking is employed for the most part. At intervals to match the package size, inverted channel section steel planks are clipped over the tubes to form the display shelving. Along the walls Dexion angle, with reconstituted timber boards, is used. Because the customer has to help himself the height of the stacks is limited to about 8 ft. and the interior height of the warehouse is similarly conditioned. The range of lines available is very wide and includes besides dry and canned groceries, bacon, butter, cooked meats and hams, prepackaged vegetables and meats, wines, spirits and tobacco, confectionery, chemists' sundries, some hardware, household goods, soft drinks and—taking a cue from the retail supermarket—an occasional "special attraction," probably something one does not usually associate with the grocer's shop.

Back to Market for Grocers

The customer, and this means not only the small independent grocer, but also chemists, hardware men and canteen operators, has a registration card. On arrival, he parks his car or small van outside the exit door, enters the warehouse, takes a long narrow trolley from the park and perambulates between the racks. Every package is clearly labelled as to price (nothing over about £2 is the aim). When he is satisfied the customer wheels his trolley to a check-out booth where the girl assistant rapidly tots up the bill on her cash register, the cash is paid and then out to the van to load the purchases. Evening, especially Monday evening, is a popular time for many customers and Eastcote stays open until 9 p.m. three nights a week. A total of nine warehouse staff, some of them part-timers, is all that is required. Incoming stocks are received over a roller conveyor, placed on stillages, labelled with the price and moved by transporter truck to the appropriate racking area. Only a few heavy items, such as packaged sugar, are left on stillage.

Turnover the Key

Of course, cash-and-carry wholesaling is not without its problems. It is essential to the maintenance of these very low prices that turnover be maximised and this means that Weston cannot rest content with the humblest of customers. It must go after the larger independents, enticing them away from the alliances if need be. To do this it has to emulate the latter by offering ancillary services—shop fittings and all the rest of it. But increasing turnover of stocks does bring the problem of re-stocking. There is no buffer storage available in the warehouse and this necessitates frequent and reliable deliveries—it may mean also more staff for handling. One thing seems certain—cash-and-carry is here to stay (Weston talks of a minimum 200 warehouses) and it will mean a big headache for manufacturers and wholesalers who are wedded to an expensive transport system of their own. Cash-and-not-to-carry may in fact be their only way out.

Tube Investments announces a £3 million project for doubling the capacity of the highly mechanised plant of its subsidiary, Tubes, Limited, for the production of ballbearing and other heavy-duty alloy steel tubes at Desford, near Leicester. Preparatory work is already in hand and the extensions are scheduled to be completed early in 1962.

FORTHCOMING EVENTS

- July 2.—P.W.I. Visit to Royal Albert Bridge, Plymouth. Joint visit with Exeter and West of England section.
- July 3.—S.C.T.S. Trolleybus tour of Portsmouth.
- July 5.—A.F. Extraordinary general meeting and films. Imperial Hotel, Elizabeth Street, S.W.1. 7 p.m.
- July 5-6.—Royal Agricultural Show, Cambridge.
- July 8.—I.R.T.L. G. R. Thomas, "The 1960 League Convention." Exchange and Engineering Centre, Birmingham. 7 p.m.
- July 9.—W.W.R.T.S. Visit to Stanton Ironworks.
- July 13.—I.R.T.L. Films by A. W. T. Daniel. 153 Drummond Street, N.W.1. 7 p.m.
- July 16.—S.R.L.D.S. Visit to Lowestoft concrete works.
- July 17.—O.S. (N.W. and Yorks). Visit to Rawtenstall, Ramsbottom and Haslingden undertakings. Rawtenstall Corporation Transport, Bacup Road, Rawtenstall. 2.30 p.m.
- S.R.L.D.S. Mystery tour of Surrey and Sussex.
- July 23.—O.S. Study tour of Peterborough area independents. O.S. (Northern). Study tour of Bishop Auckland area.
- P.W.I. Inspection of new L.T.E. works between Harrow and Rickmansworth.
- September 5-11. Society of British Aircraft Constructors. Annual flying display and exhibition. (Public days September 9-11.)
- September 12-16.—Municipal Passenger Transport Association Conference at Douglas, I.O.M.
- September 23-October 1.—Commercial Motor Show, Earls Court.

**A nation-wide supply network
of POWER grades
for all your fuel needs**

POWERPLUS

POWER

POWER DIESEL

THE POWER PETROLEUM CO LTD • Depots throughout the Country • Agency Pumps in all areas

B.T.C. REPORT FOR 1959

Railways Recover Ground

GOOD YEAR FOR B.R.S. AND HOTELS

ALTHOUGH there was still a loss, the results of the British Transport Commission for 1959, as shown in the annual report and accounts published on June 30 (H.M. Stationery Office, Vol. I (Report) 6s.; Vol. II (Accounts) 15s.), show a substantial improvement over the previous year. The working deficit on British Railways was reduced from £48.1 million in 1958 to £42 million last year, and the working surplus of the other undertakings rose from £20 million to £29.4 million. The latter is the best result achieved in the history of the Commission. The total working deficit for the undertaking as a whole was consequently £12.6 million compared with £28.1 million in 1958, an improvement of £15.5 million.

Working expenses of British Railways were reduced by £20.3 million and were, in fact, only little higher in 1959 than in 1956, in spite of the increases in price and wage levels during the three years. The savings mainly reflected the search for greater efficiency and the benefits of modernised equipment, but were also partly due to the lower level of freight traffic. Although the number of passenger journeys was fewer by two per cent, passenger miles increased.

The loss of £42 million on British Railways, plus a similar sum for financial charges, was transferred to special account under the arrangements for deficit financing laid down by Parliament. The net surplus of £10.1 million in respect of the other activities, compared with only £1 million in 1958, was carried to net revenue account. The report says that this is "a most gratifying outcome to which all the principal activities, other than inland waterways, contributed." It adds that the improvement in British Railways would have been more pronounced if the revival of the heavy industries on which the railways largely depend for freight traffic receipts had not lagged behind the improvement in the rest of industry.

More General Merchandise Carried

The demand for coal and coke continued to decline during 1959 and railway receipts from this traffic again fell considerably, although the proportion of coal and coke carried on rail increased slightly. Against this, efforts to obtain more general merchandise traffic had made encouraging progress in 1959, which was the first year for a very long time to show increased carryings of this class of traffic by rail. At the end of the year, trends in both minerals and general merchandise traffic were firmly upward. In spite of big difficulties, including staff shortages in some areas, the regions had gone very close to achieving the targets which the Commission had set them at the beginning of the year. "This achievement," the report comments, "illustrates the strong sense of responsibility for their financial results shown by each area board and general management."

Among the other freight-handling undertakings, British Road Services increased the tonnage carried in 1959 by 6 per cent in spite of mounting competition—general haulage tonnage actually rose by 7½ per cent, and their net receipts rose from £2 million to £3.1 million. Net profits of British Road Services, Limited, amounted to £1,073,300 (£402,635), those of B.R.S. (Parcels) Limited, to £734,217 (£508,796) and those of B.R.S. (Pickfords), Limited, to £795,503 (£677,225). The Commission's ships carried more of every class of cargo except livestock, and their net receipts went up from £2.3 million to £3.9 million. In spite of the decline in coal movement, for which many docks were originally laid out, revenue from the docks equalled their highest previous level and the net receipts of £2,767,328 compared with £2,167,448 for 1958. The position on the waterways did not seriously change and the deficit rose slightly from £195,632 to £215,074.

Passenger Traffic and Hotels

The Commission's passenger traffics were "surprisingly good" in view of the accelerating growth of private transport. Gross receipts were £10 million more than in 1958, an increase of 3.5 per cent, which largely offset the fall in freight receipts. Passenger miles on British Railways were higher, and, helped by the fine summer, Tilling and Scottish buses managed to maintain traffic at about the 1958 level with the result that the Tilling Group had net receipts some £339,240 higher at £3,692,307, while the Scottish Group figure rose from £2,618,944 to £2,873,850. Although London Transport traffic recovered partly from the effects of the 1958 bus strike, it was hindered by limitations outside its control such as road traffic congestion, and in the circumstances did well to pay its way in 1959. The road services showed net receipts of £3,996,924 (deficit of £787,791) and the railways had £2,032,827 compared with £2,597,367.

Travel on London buses was higher than in 1958, but when allowance is made for the strike of that year, it appears that the gradual downward trend of recent years continued. On L.T.E. railways travel has been more stable in total over recent years, although the average length of journey has tended to shorten. Efforts to improve or maintain the speed and regularity of buses at peak hours have been largely frustrated by growing congestion of the streets. The Pink Zone experiment improved bus movement inside the zone while it was in operation but outside the zone conditions became worse. The number of bus rides per head of London population fell from 365 in 1958 (adjusted to allow for the strike) to 341 in 1959. "This represents a serious decline in the use of public transport, and reflects the great growth of ownership of cars, motorcycles, and mopeds stimulated by the lifting of controls on hire-purchase." A major programme of street improvements, together with adequately enforced parking meter schemes, would be necessary if London Transport in future "is to fulfil adequately the natural task which belongs to public transport in a great city like London."

For the Hotels and Catering Services activities as a whole the results in 1959 were the best since the first year the Commission took over. Aggregate gross receipts were the highest since formation and their net receipts showed a substantial surplus. For the hotels gross receipts were £8 million, an increase of £0.5 million, and net receipts were nearly £400,000 compared with £127,000 in 1958. Gross receipts in refreshment rooms were £10.4 million, or £0.1 million higher, and net receipts at roundly £500,000 were £100,000 better. On the restaurant cars gross receipts, in spite of the

unofficial strike of restaurant car staff, were £4.3 million, or £0.1 million higher. These were the highest gross receipts yet achieved, but the net result was still a deficit of £500,000, which was better than 1958 by £200,000.

Property Management

Gross receipts from property management were £1,925,000, an increase of £38,000 over 1958, while net receipts at £1,708,000 showed an improvement of £25,000. Gross receipts from letting of property again increased despite further sales of property. Net receipts from letting of sites and premises on properties in operational use were a little higher at £1.7 million and those from letting of land and buildings not in operational use were £4.7 million, an increase of £0.7 million. Sales of property during the year, amounting to over £1 million, brought the total realisations from property since 1948 to about £12 million.

Planning restrictions continued to limit the best use of sites, particularly at London termini, where the Commission maintains that the building of offices over the stations would help to relieve traffic congestion. The disadvantage to the Commission of having no statutory powers to carry out construction not required for operational purposes became increasingly apparent. By being debarred from direct participation in property development the Commission is put in a position of exceptional disadvantage, which involves loss of potential revenue.

"Public Transport Vital"

"From all these results," the report continues, "it is evident that public transport still bears a vital responsibility in the life of the nation, even if the number of passenger road vehicles licensed is going to double in the next 15 years." For its part the Commission had given the managements concerned every encouragement to keep on improving the comfort, convenience and punctuality of the services offered; at the same time the fares paid for these services should be made to correspond with the cost of providing them. They had by no means kept pace with the general level of prices in the country. Even after the adjustments which were made in rail, bus and coach fares during 1959 by sanction of the various fare-fixing authorities, most of these fares in real terms were at the year's end still well below their level prewar. The quickened pace of modernisation and rationalisation was fully maintained and the investment expenditure on British Railways amounted to £168 million in the year compared with £141 million in 1958. Conspicuous progress was made in nearly all sections.

Non-Political Report

A brief reference is made to the advisory group recently appointed by the Government to examine the structure and working of the organisations controlled by the Commission and to the Select Committee on the Nationalised Industries which is examining the organisation, activities and results of British Railways, taking the 1958 report and accounts as a starting point. "While two inquiries of political origin are taking place," it says, "it would clearly be undesirable to describe once more the factors which tend to delay or even jeopardise the attainment of viability by the undertaking as a whole." The report was, therefore, confined strictly to summarising the commercial and technical advances made "in all sections of a large and hard-working enterprise."

It mentions, however, that the Commission continued in 1959 with the evolution of the administrative and managerial structure. "As in all large-scale industrial concerns," the report continues, "such evolution, under the most favourable circumstances and granted continuous official support, would normally take some years before a well-balanced organisation is obtained, combining autonomy in day-to-day management in all the operating divisions and associated companies with a measure of central policy control."

Value of Area Boards

"As experience was gained, the devolution of greater authority to the area boards continued steadily during 1959. In carrying forward, year by year and stage by stage, this process of decentralisation, the Commission had greatly benefited from the very wide experience of large-scale business organisation and of labour relations which the 40 or so part-time members of the Commission and the area boards had been able to contribute."

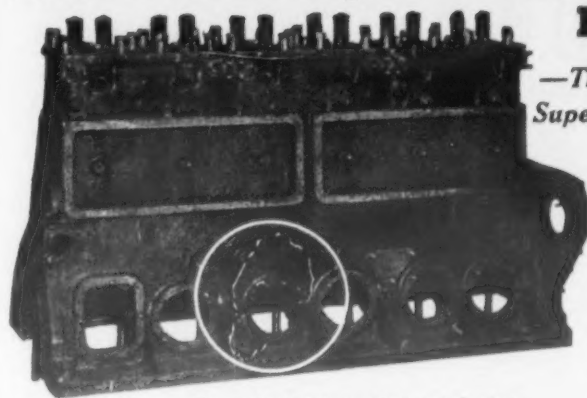
In regard to organisation there were further improvements in administration and management which were introduced from January 1, 1960, and included the setting up of a new traffic committee to promote new or improved transport services and increased operational efficiency. The new system of traffic management on British Railways has settled down well, and in five regions the new organisation, representing a revolution in railway management, is now functioning at full strength.

Diesels Satisfactory After Early Troubles

In approving further orders for diesel locomotives, the Commission has adopted a programme for standardisation and a reduction in the number of types and makes. In future, the standard types will be concentrated in particular regions to simplify maintenance, etc. The report adds: "In spite of a few teething troubles with newly delivered locomotives, which gave rise to some adverse publicity, the Commission feel well satisfied with the performance of their new main-line diesels, both those built in their own shops and those supplied by industry. Early troubles were associated mainly with accessories such as train-heating boilers, which have proved especially troublesome." The Commission claims to have gone as far ahead in the mechanisation of office work, including the use of electronic equipment, as any other industry in the country.

The total number of B.T.C. employees at the end of the year was 735,535, a decrease of 38,376. This section also refers to "remarkable results" through the application of work study, not only in terms of increased efficiency and productivity but in improved human relations. "Work study has now been used in almost every branch of the Commission's undertaking," the report says. "From the replies received to a questionnaire sent out by the International Railway Congress Association throughout the world it would seem that British Railways are well to the fore in this field."

Where Delicacy Plus Strength are Essential

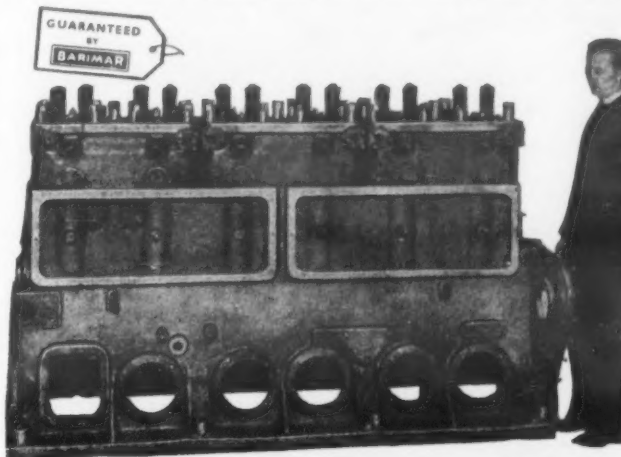


—There is Skill and Superb Craftsmanship in Barimar Scientific Welding

IT IS WIDELY CONCEDED that any welding repair entrusted to Barimar is good for years of strenuous service. It is no less accepted that the more difficult the repair, the greater the rest of these pioneer welders.

This combined Cylinder Block and Crankcase of a Diesel Engine was seriously cracked close to two main bearings.

Here, for example, was a difficult welding problem: A combined cylinder block and crankcase from a Diesel Engine was fractured in the centre of one side of the casing—a repair demanding Low Temperature Welding. Although, as can be seen, the fracture was close to two of the main bearing housings, the welding was carried out with delicacy and skill. In other words, the experts avoided disturbance of the alignment of the seven bearing housings, besides investing the giant crankcase with additional strength. This was a 4-day's job. Its cost, as the owners agreed, was "insignificant." Barimar saved them time, money, anxiety—and guaranteed the repair without reservation.



Barimar carried out the repair under their Money-Back Guarantee. Barimar's wide experience is at all times at the reader's service. A letter, telegram or phone call will receive immediate attention night or day in any and every kind of breakdown.

BROKEN PARTS which are transportable should be delivered or sent CARRIAGE PAID to the nearest Barimar address. Please remove all fittings and advise despatch. When it is impossible to transport machinery Barimar experts operate ON THE SPOT.

BARIMAR LTD.

Barimar House, 22-24 Peterborough Road, FULHAM, LONDON, S.W.6

Telephones: RENown 2147-2148 Night 2148 Telegrams: "Bariquamar, Walgreen, London, S.W.6"

Barimar Branch Addresses: BIRMINGHAM, 12: 116-117 Charles Henry Street. Phone: Midland 2886. NEWCASTLE UPON TYNE, 1: 64-66 The Close. Phone: Central 21035. GLASGOW, C.2: 124 West George Lane. Phone: Central 4709.

THE WORLD'S SCIENTIFIC WELDERS

Good braking starts...



...and ends with **FERODO**

Anti-Fade Brake Linings

Ferodo First



FERODO LIMITED · CHAPEL-EN-LE-FRITH

A Member of the Turner & Newall Organisation

THE

KARRIER**"Gamecock"**
3-4 TONNER*with alternative power
units of outstanding
economy and durability***PETROL...**the phenomenal
91 b.h.p. six-cylinder with
porous chrome bores.**DIESEL...**the amazingly economical
87 b.h.p. six-cylinder with
chrome-plated steel
cylinder liners:

* or the remarkable

ROOTES DIESEL ENGINE—a direct injection
two-stroke with opposed
pistons, developing 85 b.h.p.

WITH its manoeuvrability, low loading height and alternative 'under-floor' power units providing long, trouble-free service between overhauls, the Karrier 'Gamecock' is the ideal vehicle for the busy operator. The new three-seat cab with panoramic windscreen affords maximum visibility and comfort for driver and two passengers and is insulated against noise and extremes of temperature, thus reducing driving fatigue to a minimum. Alternative wheelbases of 9' 7" and 11' 9" are available.

Greater value than ever before!**A ROOTES PRODUCT—BUILT STRONGER TO LAST LONGER!**

KARRIER MOTORS LTD. LUTON BEDS. EXPORT DIVISION: ROOTES LTD. DEVONSHIRE HOUSE PICCADILLY LONDON W.1

Firestone

'SUPER TRANSPORT'

**A premium tyre
for lower
running costs**Wider, Flatter Tread
More Road Contact, Greater Stability
Less WearSafer, Stronger Body ...
Safety-Tensioned Gum-Dipped
Cord Body Prevents Growth, Tread
Cracking, Ply SeparationDeeper non-skid pattern
and a greater volume of tread rubber
—for higher mileage**Experience Counts—**45 Factories throughout the world.
Firestone total sales exceed £1,000,000 per day.**Firestone TYRES**
—consistently good**IMPORTANT CONTRACTS****Super VC10s for B.O.A.C.**

SIGNATURES last week on a contract with the British Aircraft Corporation for the purchase by British Overseas Airways Corporation of 10 Vickers Super VC10 jet air liners, valued at £25 million without spares, completed B.O.A.C. current aircraft fleet requirements and brought the value of the corporation's investment in products of the British aircraft industry since 1949 to a total of £214 million. In addition, some £9 million is being spent on Rolls-Royce Conway engines fitted to B.O.A.C. Boeing 707s. Like the standard VC10s, of which B.O.A.C. has ordered 35, the Super VC10s will be powered by four Rolls-Royce Conway bypass turbojet engines mounted at the rear of the fuselage. Delivery of the Super VC10s is scheduled to start early in 1965. The B.O.A.C. version will carry up to 187 passengers and is intended for the corporation's North Atlantic routes.

£100,000 Gearbox Contract

The David Brown Automobile Gearbox Division has negotiated a £100,000 contract covering the long-term supply of commercial vehicle gearboxes to a leading British manufacturer.

I.H. Tractor to be Made in Spain

Under an agreement concluded between International Harvester Co. of Great Britain, Limited, and S.A. de Construcciones Agrícolas de Sevilla, a version of the I.H. B275 tractor is to be manufactured under licence in Spain.

A.E.C. Double-Deckers for Pakistan

The Karachi Transport Board has placed an order with A.E.C., Limited, for 12 A.E.C. Regent V double-deck chassis to be fitted with M.C.W. all-metal bodywork. Both chassis and bodies will be supplied in knocked-down form and assembled in Karachi.

Coaches for Air France

Air France has ordered 16 new 40-seat Savien coaches to operate between Orly Airport and the Gare des Invalides. They are to be fitted with what are claimed to be specially silent 150-h.p. under-floor engines, automatic transmissions, panoramic windows and aircraft-type seats, and interior décor will resemble that of the Caravelle jet aircraft.

El Al 707 Order Confirmed

El Al Israel Airline has confirmed its order for two Boeing 707 Intercontinental jet air liners and has taken an option on a third. The airline announced its intention to buy Boeing jets in March. Final action on the order came after approval by the Israeli Government and arrangement of satisfactory financing terms. Delivery is scheduled for May and June, 1961.

New I.C.T. Computer in Demand

Three orders from overseas are included in 12 orders, worth more than £1,000,000, received by International Computers and Tabulators, Limited, for its new business computer, the I.C.T. Type 1301 data processing system. The 1301 was announced only at the end of May. In addition a large number of inquiries has been received. Two of the overseas orders come from Sweden and one from Australia.

Boeing Turbine Hydrofoil Craft

Boeing Airplane Company has received a contract from the United States Navy Bureau of Ships for the construction of an advanced hydrofoil patrol craft. With a length of 115 ft. and a full load displacement of 110 tons, the craft will be powered by two 3,000-h.p. gas turbines during foil-borne operations. Though a new field for Boeing, the company's tender, at over \$2 million, was accepted against those of 10 other bidders.

New Trains for Melbourne—Sydney Route

Commonwealth Engineering Co., Limited, Sydney, has been awarded a contract to build 34 stainless steel coaches required for two de luxe night trains on the Melbourne—Sydney route. Bids for the contract were entered by manufacturers from many other countries. The new trains, which will be hauled by 1,800-h.p. diesel-electric locomotives and reduce the present 15-hr. Melbourne—Sydney journey time by 2 hr., will be jointly owned by the Government Railways of Victoria and New South Wales.

Scottish Region Contracts

The following contracts have been placed by the Scottish Region of British Railways:

James Scott and Co. (Electrical Engineers), Limited, Perth, for electrical installation at Perth new marshalling yard.

Whatlings, Limited, Glasgow, for piled supports for new under-bridge, Kilwinning by-pass road.

Blackburn (Dumbarton), Limited, Dumbarton, for carriage cleaning facilities at Bridgton Central.

The Scottish Machine Tool Corporation, Limited, Johnstone, for reconditioning of London wheel lathe at Cowlish Works.

R. F. Morrison and Co., Limited, Glasgow, for suspended ceiling, Queen Street Low Level Station, Glasgow.

James Young (Contractors), Limited, Glasgow, for raising, reconstruction and widening bridge at Eglinton Street Station, Glasgow.

Eastern Region Contracts

The Eastern Region of British Railways announces the following contracts:

International Computers and Tabulators, Limited, London, W.1, for one Type 1301 computer for Machine Accounting Centre, Regional Accountant's Dept., Peterborough.

Kennion, Irvine and Co., Limited, London, S.W.1, for Arki-Endon tracklaying cranes and associated equipment.

Carter-Horseley (Engineers), Limited, Crofton, for repairs to main girders and flooring of bridge between Whittealea and Peterborough East.

James Kilpatrick and Son, Limited, London, S.E.1, for electrical installation, m.v. distribution, fuelling installation, control wiring for washer, etc., at billet sidings, Stratford.

Matias Equipment, Limited, Chertsey, for two Matias ballast cleaning machines and associated equipment.

Mitchell Engineering, Limited, Peterborough, for repairs to mechanical cooling plant at Peterborough New England.

Crompton Parkinson, Limited, Chelmsford, for e.h.v. and m.v. switchgear and cables, transformers and rectifier at Doncaster Wagon Works.

North Eastern Region Contracts

The North Eastern Region of British Railways announces the following contracts:

G. P. Dennis, Limited, Liverpool, for three medium-voltage switchboards for the research and development unit at Stoope-dale.

The Scottish Machine Tool Corporation, Limited, Glasgow, for a 200-ton hydraulic press brake for the research and development unit at Stoope-dale.

Henry Broadbent, Limited, Sowerby Bridge, for an 18-in. break-type lathe for the research and development unit at Stoope-dale.

Brown and Tawse Plant, Limited, Manchester, for hydraulic winches and motors in connection with the construction of electric cable ducts for use by the chief civil engineer's department.

Mitchell Construction Co., Limited, Peterborough, for supply, spreading and compacting of ballast filling at Healey Mills new marshalling yard.

C. Campling (Goole), Limited, Goole, for general repair work to the swing bridge at Goole.

J. W. Roberts, Limited, Bolton, for glass fibre plastics panels for Smithy Lane Bridge, Lamesley new marshalling yard.

Dow Mac (Products), Limited, Stamford, for prestressed concrete beams in connection with the reconstruction of a railway bridge near Marske.

SHIPPING and SHIPBUILDING**Newport to Export Cars**

FINAL discussions are now being held between the British Transport Docks and British Car Carriers, Limited, on the proposal by the latter that a modern car shipment terminal shall be built at Newport, Mon. It would be in operation by the middle of next year. The terminal will be built on a 14-acre site at the west end of the South Dock and about 150,000 vehicles would pass through there each year. British Car Carriers, Limited, is having two 19,000-ton vessels built for exporting cars from Newport. They are under construction at Rotterdam and are expected to be completed by next summer. The ships, fitted with lifts and turntables, are built so that they will be able to carry bulk cargoes, such as iron ore, on their inward voyages.

P. and O.—Orient Lines in U.S.A.

NEW headquarters of P. and O.—Orient Lines in North America have been officially opened. The new office will house administration, sales and shore-side operations.

Government Line Planned in Malaya

THE Federation Government in Malaya has plans to set up a national shipping line "to put the country into the world market." But, says the Minister of Transport, Inche Sardon bin Haji Jubir, so far nothing concrete had developed from it. The Government is continuing to collect data for the project.

Diesel Electric Tug

ONLY the second of her type in the country and the largest and most powerful tug in the B.T.C. South Wales fleet, the diesel-electric tug *Llanwern* was handed over to the Commission at Newport, Mon., on June 24. Named after the new Spencer steelworks being built at Llanwern, she is intended mainly to work with the ore carriers which will come to the port to supply the works. She was built by P. K. Harris at Appledore in conjunction with Seawork, Limited. She has Vickers-Armstrongs electro-hydraulic steering.

New Japanese Liner Service

NIPPON Yusen Kaisha (N.Y.K.) is to open a liner service between Indonesia and Western Europe in August. The new service would replace the services of Dutch shipping lines, which have been banned by the Indonesian Government from calling at Indonesian ports. Several West European shipping lines were also expected to open similar liner services. The principal ports of call on this N.Y.K. route—with one sailing a month—would include Balikpapan, Singapore, Hamburg, Rotterdam, Antwerp and London.

A Belfast Record Broken

WITH the launching of the Shaw Savill 11,250-ton gross refrigerated cargo liner *Icenic* last week, Harland and Wolff, Limited, set up a new record for the half-year's output at Belfast and, indeed, a probable record for the British shipbuilding industry. The output in the first half of 1960 at Belfast alone has been 120,000 tons. Mr. Basil Sanderson, chairman of the owners of *Icenic*, in a reference to current competition for building orders, said that the 30 postwar Shaw Savill ships had been constructed by seven different builders.

Dundee, Perth and London Line

COMPETITION from road and rail is blamed by Mr. F. D. J. Buist, chairman of the Dundee, Perth and London Shipping Co., Limited, for a drastic reduction in the number of coasting liners operating regular services between mainland ports of the United Kingdom. Ten years ago, he says in his annual statement, there were 45 ships owned by several companies, which maintained regular liner services between mainland ports of the United Kingdom; today the number of ships so engaged has fallen to 17. Hinting at a possible withdrawal of the Dundee—London service, Mr. Buist says the time may come when they will be unable to provide a public service at private expense.

FINANCIAL RESULTS

NOTES on the trading results, dividends and financial provisions of companies associated with the transport industry are contained in this feature, together with details of share issues, acquisitions and company formations or reorganisations.

Maidstone and District Motor Services

Maidstone and District Motor Services, Limited, reports net profit for the year ended March 31 was £246,500 (£187,688) and dividend 10 per cent (same).

R. A. Dyson

For the year ended March 31 the profit shown by R. A. Dyson and Co., Limited, is £112,498 (£118,971). After depreciation £8,436 (£8,041), tax £43,826 (£46,492), etc., net profit was £45,408 (£50,287). Final dividend 12½ per cent, making 21½ per cent (20), forward £74,848 (£61,977).

Aldershot and District Traction

Final dividend of the Aldershot and District Traction Co., Limited, 5 per cent free of tax making 7½ per cent free of tax for year ended May 31, 1960 (10 per cent less tax). Net profit £81,770 (£84,914), after tax £64,300 (£43,476). Provision for rolling stock obsolescence £10,000 (same), general reserve £20,000 (£25,000), forward £109,633 (£104,738).

George Ewer

The new subsidiary, Scott Bros. (Colchester), Limited, acquired in May, 1959, shows a satisfactory return with good prospects ahead, says George Ewer and Co., Limited. Group fixed assets at December 31, 1959, £982,947 (£816,920), current £70,418 (£40,927) and liabilities £173,726 (£140,703)—overdraft £40,529 (£24,015). Loan from bank £55,000 (nil). The profit before tax was £74,177 (£64,820) and dividend 21 (18½) per cent. The new acquisition at Colchester is a garage business with car and commercial vehicle dealership.

On June 1, the headquarters of Dunlop Passenger Transport Division (formerly known as National Sales Division) moved from Albany Street, London, to Fort Dunlop. The object is to bring the division into closer contact with the Dunlop Research, Technical and Production Divisions, thus to extend and improve the company's service to the passenger transport industry.

A recent important order for Lily plastic-coated throw-away cups (made by Lily Cups and Containers (England), Limited, Fazakerley, Liverpool, 9) has been placed by British Transport Catering Services. The general reception of this cup has been excellent. It was chosen for its strength, even with the hottest liquids, and for its complete lack of taste.

SOCIAL AND PERSONAL

S.B.A.C. President

THE council of the Society of British Aircraft Constructors has elected Sir George Dowty as president of the Society for 1960-61, with the Hon. George Nelson as vice-president. Sir Aubrey Burke, O.B.E., who was president in 1958-60, becomes deputy president. Sir Frederick Handley Page, C.B.E., was re-elected treasurer.

As announced in our last issue, Mr. T. R. Bilbow, F.R.I.B.A., architect, London Transport Executive, is to retire on July 9. He joined the staff of the architect to the Underground group of companies as an architectural assistant in 1922, his first task being to prepare designs for the new stations on the Hampstead Line (now Northern Line) extension from Golders Green to Edgware. On the formation of the London Passenger Transport Board in 1933, Mr. Bilbow was appointed senior assistant (railways) in the office of the



Mr. T. R. Bilbow

architect. In 1938 he was made assistant architect and in the same year he visited several European countries to study and report on concrete finishings. He was appointed architect in January, 1945, and was made an officer of the Board in November of the same year. Among the postwar buildings for which Mr. Bilbow has been responsible are Aldenham bus overhaul works, many bus garages, Wood Lane Station (which was given a Festival of Britain award), Notting Hill Gate Station and the new railway depot at Upminster.

Mr. E. Thompson, C.A., of Lamb's Garage, Limited, Dundee, has been elected chairman of the Scottish Motor Trade Association for 1960-61.

Mr. G. M. Wilson has been appointed district commercial officer, traffic manager's office, Kings Cross, Eastern Region, B.R.

The Institute of Petroleum announces an international symposium on engine testing of crankcase lubricating oils at Brighton in May, 1961.

Mr. P. A. White, line traffic manager, South Eastern Division, Southern Region, B.R., has been made assistant general manager (traffic) to succeed the late Mr. S. A. Fitch, with effect from June 13.

The Atlantic Steam Navigation Co., Limited, owner and manager of the Transport Ferry Service, announces that Captain W. N. Johnson, marine superintendent, London, has been appointed to the newly created post of chief marine superintendent.

Long service by employees of the Hoffmann Manufacturing Co., Limited, Chelmsford, was recognised by the company on June 21 when Mr. J. W. Garton, J.P., chairman and managing director, presented gifts to 47 men who had completed 40 years' service, and to seven women with 35 years' service.

Changes in the board are announced by the Orient Steam Navigation Co., Limited. When Sir William C. Currie retired from the board on June 30 and Sir Donald F. Anderson succeeded Sir Austin I. Anderson as chairman the latter retained his seat on the board and the following were appointed thereto, viz. Messrs. F. I. Geddes, R. M. Thwaites, A. J. M. Crichton and M. M. Millar.

Twenty M.P.s, members of the All-Party Roads Study Group, and drawn in equal numbers from both sides of the Commons, leave London next Monday to examine road building, parking and traffic control in Sweden and West Germany as guests of the Roads Campaign Council. The delegation will be led on its five-day tour by Mr. Wilfrid Andrews, chairman of the council, and Mr. Geoffrey Wilson and Mr. Ernest Popplewell will head the Conservative and Labour contingents respectively.

It was announced in the House of Commons this week by the Minister of Aviation, Mr. Duncan Sandys, that Lord Terrington, chairman of the Air Transport Advisory Council, has agreed to become chairman of the new Air Transport Licensing Board. Mr. Sandys explained that it would be necessary during an initial period for the existing Air Transport Advisory Council to continue to function in parallel with the new Board. In order to ensure satisfactory co-ordination of the work of these two bodies and a smooth transition from one to the other, he thought he could not do better than to inquire of Lord Terrington, the chairman of the Advisory Council, whether he would be willing to take on for a while the additional post of chairman of the new board and he has expressed his readiness to do so. The names of the other members of the Board would be announced in due course.

Sir Willis Jackson, president, and Lady Jackson, on June 23 received members of the Institution of Electrical Engineers and their friends at a conversation held at the Royal Festival Hall, London. They were assisted by Sir Hamish D. MacLaren, president-elect, and Lady MacLaren. The entertainments included dancing, two concerts by the orchestra of the Corps of Royal Engineers and over 70 exhibits and demonstrations. Among these was an electronic digital recorder contributed by Mr. Stanley Warder, chief electrical engineer, British Railways; it is an analyser capable of sampling and recording on punched tape 12 different events at a rate of one every 160 milli-seconds. Used for electric traction equipment tests, it can be coupled to the 50-cycle supply or to batteries for operation and can thus be used on the ground or in moving vehicles.

Worthington-Simpson, Limited, announces the appointment of Mr. K. P. H. Jeens as manager, oil industries department, at its London office in Kingsway.

Mr. R. J. Rankin has been appointed chairman of the St. Lawrence Seaway Authority in succession to Mr. B. J. Roberts, who is retiring. Mr. Rankin is at present vice-chairman of the National Harbours Board.

Mr. K. J. H. Seymour, F.R.I.B.A., who has been appointed architect, London Transport Executive, and an officer of the Executive, started his career as an articled pupil to Louis Blanc, F.R.I.B.A. He entered the service of the London Passenger Transport Board in 1935 and until the outbreak of war was mainly engaged on designs for railway works. From 1940 to 1945 he served with the R.A.F. as a bomber pilot and was awarded



Mr. K. J. H. Seymour

the Air Force Cross. He was demobilised at the end of 1945 with the rank of flight lieutenant. In 1949 Mr. Seymour was responsible to the architect for the design and construction of Garston Garage, Watford. In 1950 he was placed in charge of a special section with the responsibility of designing London Transport's bus overhaul works at Aldenham. Among recent buildings for which Mr. Seymour has been responsible are the new garages at Hatfield and Stevenage and the bus station at Crawley New Town.

Sir Ralph Sorley, K.C.B., O.B.E., D.S.C., D.F.C., F.R.Ae.S., deputy chairman and managing director of de Havilland Propellers, Limited, and a director of de Havilland Holdings, Limited, retired at the end of June. He is succeeded as managing director of the propeller company by Mr. H. G. Sturgeon, O.B.E., who has been deputy managing director for the past three years.

The Vice-Chancellor of Southampton University recently announced the gift of £50,000 by Esso Petroleum Co., Limited, to the university centenary appeal fund. This follows a number of other donations to education made by the company, including over £80,000 to St. Catherine's College, Oxford; £35,000 to Churchill College, Cambridge; £13,000 to Manchester College of Science.

Mr. C. H. Selley, M.I.Mech.E., manager of the motor department of Shell-Mex and B.P., Limited, retired on June 30 after 38 years' service. He joined the former British Petroleum company as a motor inspector in 1922, at a time when the company was completing its changeover from horse-drawn to motor vehicles. Later he was appointed a technical assistant and then motor engineer with the company's motor department at head office. In 1933, in the newly formed Shell-Mex and B.P., Limited, he was appointed deputy manager, motor department, and in 1936 he was appointed manager. His successor is Mr. F. K. Farquharson.



Mr. C. H. Selley

Mr. U. F. M. Dellaert, having reached pensionable age, retired as managing director of Schiphol Airport Authority on June 30. His successors are Messrs. S. de Mul and J. C. H. A. van Staple.

The new national council of the Passenger Vehicle Operators Association has elected as its new chairman Mr. A. Bolton (Ribblesdale Coachways, Limited, Blackburn). The vice-chairmen are Messrs. W. Dodds, E. A. Lainson, and J. T. Steel.

We deeply regret to record the death at the age of 71 of Mr. S. E. Parkhouse, O.B.E., M.Inst.T., who was chief of operating services (British Railways), British Transport Commission, when he retired in January, 1955. Mr. Parkhouse was a London and North Western Railway man, joining that company in 1906, and had held the above post since 1948.

The annual convention of the Light Railway Transport League was held at Whitsun at Bruhl, not far from Bonn, in West Germany, and included visits to the urban tramway systems of Bonn, Cologne, Düsseldorf and Munchen-Gladbach, also the Köln-Bonner, Siegburg-Zundorf, and Langenfeld-Rheindorf rural or interurban tramways, and the Wuppertal Schwebebahn. The annual dinner at Bruhl was attended by 94 people under the chairmanship of Herr G. A. Meier, vice-president of the League and chief engineer of the Zurich City Tramways, Switzerland. During the previous week some 50 members had visited 10 of the finest mountain railways and funiculars in Switzerland, also the Lucerne Transport Museum, the B.L.S. locomotive works at Spiez, and the Centovallibahn in northern Italy, while another party of 40 spent the week following the convention in the industrial Ruhr area of Germany, with official visits to the tramway systems of Dortmund, Hagen, Bochum-Gelsenkirchen, Vestische, Essen, Oberhausen, Mulheim, Duisburg, and Remscheid, all with modern cars, also the Alweg monorail testing ground.

Daily door-to-door express container services in especially-designed container-ships to and from NORTHERN IRELAND



- All parts of Northern Ireland, Scotland and England served
- Greatly Minimised Risk of Loss by Theft or Damage
- Free Insurance (General Merchandise)—£800 per ton
- Closed Security-Locked Containers
- Insulated Containers for Perishable Foodstuffs—for Hygiene and Cleanliness
- Open Containers and "Flats" for Unpacked Machinery etc.
- All Goods Conveyed with Minimum Packing

Door-to-door inclusive rates

ANGLO-CONTINENTAL CONTAINER SERVICES

(London) Ltd and (Belfast) Ltd

LONDON 79 Dunton Road SE 1 Bermondsey 4881/4 (Head Office) and Elland Road SE 15 New Cross 4885/7 (Traffic Depot) PRESTON The Docks Preston 86742/4 LARNE (Northern Ireland) Bay Road Larne 2331/2 BELFAST 35/39 Middlepath Street Belfast 59261/5 MANCHESTER 2 270/1 Royal Exchange Buildings Blackfriars 9287/9 GLASGOW 10 Bothwell Street c2 City 6997/8 (Offices) and 17/21 Tylefield Street SE Bridgeton 2277/8 (Traffic Depot) AIRDROSSAN (Ayrshire) Harbour Street Saltcoats 1911/2 BRISTOL 61 Park Street Bristol 25435/6

THE HISTORY OF WAGONS-LITS

1875-1955

by

George Behrend, M.A., F.R.G.S.

A new 32-page book, giving an excellent descriptive picture and historical background of this famous international company, covering a period of eighty years and containing 32 illustrations and line-drawings.

Price 3s. 6d.

Order your copy now from your bookseller or direct from the publisher.

Modern Transport Publishing Co. Limited

3-16 Woburn Place, London, W.C.1

REPORTING
RAILWAY
PROGRESS **8**

IT'S EASY BY TRAIN

↑
THE WAY AHEAD New outlook for suburban travellers . . . streamlined, airy, picture-window coaches. Gay but restful decorations. Comfortable seats.
↓



In and out of Britain's big industrial centres every working day go millions of rail passengers - over 1½ million in just the London area. Only trains can carry commuters on this scale.

Electric trains are tightening the timetables, raising standards of speed, frequency and comfort. Already they give London and the Home Counties the world's busiest and most efficient surface railway network. Thousands of Southern Region trains carry three million people every week - more than all the main-line railways of the U.S.A. put together. Liverpool, Manchester, Newcastle too, they know what electric service means. This year electrification is coming to Scotland - to Glasgow's suburban lines north of the Clyde. More electrification schemes are now under way east and south-east of London. Two, Gillingham-Kent Coast and Colchester-Clacton-Walton, are finished; on the first, 80 miles in 104 minutes with five stops - the kind of speed that will be routine throughout. A third, Liverpool Street-Enfield, Chingford, Hertford East and Bishop's Stortford, will also go into service this year. Here is the answer to the traffic log-jam. Not only speed. Not only frequency. These new trains offer something extra to the town worker: relaxation, away for a while from the scramble of crowded streets.



ROOM TO RELAX Modern, cheerful, comfortable: newly-designed carriages for the Manchester-Crewe line illustrate the style of the future in rail travel. It's cleaner, more spacious.



THEY'RE SAVING TIME Passengers on the London-Kent Coast services now travel considerably faster on their journeys. High standards for all - as in these new second class open carriages.



DRINKS AT THE BUFFET Coffee and biscuits: a bright, friendly bar, offering drinks and light snacks, is popular with long-distance regulars.

**NEXT:
VERY IMPORTANT
PASSENGER**

Photographs: Roger Wood and Patrick Ward